

2009 Report on Ethanol Market Concentration

I. Introduction

Section 1501(a)(2) of the Energy Policy Act of 2005, as codified at 42 U.S.C. § 7545(o), imposes an annual requirement on the Federal Trade Commission (“Commission” or “FTC”) to “perform a market concentration analysis of the ethanol production industry using the Herfindahl-Hirschman Index [(“HHI”)] to determine whether there is sufficient competition among industry participants to avoid price-setting and other anticompetitive behavior.”¹ The statute also requires that the FTC consider all marketing arrangements among industry participants in preparing its analysis. The FTC must report its findings to Congress and to the Administrator of the Environmental Protection Agency (“EPA”). This report presents the FTC’s concentration analysis of ethanol production for 2009. It builds upon Commission reports from previous years, which contain relevant background information that is not repeated in this report.²

For purposes of this analysis, FTC staff (“staff”) reviewed and analyzed publicly available data and conducted interviews with ethanol producers, marketers, and other industry participants. As in previous reports, FTC staff calculated HHIs for the ethanol production industry using different measures of concentration. Staff measured the market share for each producer according, first, to the producer’s production capacity and, second, to its actual

¹ Energy Policy Act of 2005 § 1501(a)(2).

² See FTC, Report of Ethanol Market Concentration (2005) (“2005 Ethanol Report”), available at <http://www.ftc.gov/reports/ethanol05/20051202ethanolmarket.pdf>; Report of Ethanol Market Concentration (2006) (“2006 Ethanol Report”), available at http://www.ftc.gov/reports/ethanol/Ethanol_Report_2006.pdf; Report of Ethanol Market Concentration (2007) (“2007 Ethanol Report”), available at <http://www.ftc.gov/reports/ethanol/2007ethanol.pdf>; Report of Ethanol Market Concentration (2008) (“2008 Ethanol Report”), available at <http://www.ftc.gov/os/2008/11/081117ethanolreport.pdf>.

production. Staff then performed separate HHI calculations using three different methods that attribute market share to: (1) the producer itself; (2) the firm that actually marketed the producer's ethanol output; and (3) the marketing firm only when marketing the producer's volumes pursuant to a pooling agreement.³ Under all of these measures of concentration, the HHI levels for 2009 are lower (indicating less concentration) than those calculated in the 2008 report. Based on production capacity, the HHIs for domestic ethanol production range from 241 to 547. Based on actual production, the HHIs for domestic ethanol production range from 232 to 722.

Assuming U.S. fuel ethanol⁴ production is a relevant market for competition analysis, these figures indicate that domestic fuel ethanol production is unconcentrated.⁵ Consequently, these HHI figures do not justify a presumption that a single ethanol producer or marketer or a small group of such firms could wield sufficient market power to set prices or coordinate on prices or output across the United States.

³ See Section IV, *infra*.

⁴ This report analyzes fuel ethanol concentration, rather than concentration of all ethanol. Fuel ethanol contains about five percent denaturant, such as gasoline, rendering it undrinkable and not subject to the beverage alcohol tax. <http://www.ethanolrfa.org/resource/made/>. Thus, fuel ethanol and alcohol used in beverages are not substitutes for each other.

⁵ The Commission and the Department of Justice characterize markets where the HHI level is below 1000 as unconcentrated, or competitive. HHIs between 1000 and 1800 indicate moderately concentrated markets, which may or may not raise competitive concerns. Markets with HHIs over 1800 are highly concentrated and are more likely to pose competitive concerns. U.S. Department of Justice and Federal Trade Commission Horizontal Merger Guidelines (1992, revised 1997) ("Horizontal Merger Guidelines") § 1.51, *available at* <http://www.ftc.gov/bc/docs/horizmer.htm>.

II. Recent Industry Developments

In 2007, Congress significantly increased the minimum amount of renewable fuel that must be used domestically, whether in the form of ethanol blended into gasoline or in the form of biodiesel. The minimum amount, known as the Renewable Fuel Standard (“RFS”), was previously set by the Energy Policy Act of 2005 at 6.1 billion gallons for 2009 and was scheduled to rise each year until reaching 7.5 billion gallons in 2012.⁶ The Energy Independence and Security Act of 2007 raised the 2009 RFS to 11.1 billion gallons and increased the mandated volume to 36 billion gallons by 2022.⁷ Additionally, starting in 2016, the marginal increases (*i.e.*, the additional volume increases over previous years) in the RFS must be met with advanced biofuels, defined as cellulosic ethanol and other biofuels derived from feedstock other than corn starch.⁸

In recent years, the amount of ethanol blended into domestic gasoline has exceeded the RFS standard. This trend continued in 2009, when a large number of refiners, blenders, and marketers blended more ethanol into gasoline than in the previous year. During 2009, the industry blended more ethanol in each month than in the previous month (with the exception of January and February), and blended more in each month than in the same month in 2008.⁹ Industry participants believe that the industry will meet the updated 2009 RFS.

⁶ Energy Policy Act of 2005 § 1501(a)(2).

⁷ Energy Independence and Security Act of 2007 § 202.

⁸ *Id.*

⁹ <http://tonto.eia.doe.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=mferius1&f=m>.

In the 2009 economic climate, many industry participants experienced credit and capital constraints. In previous years, ethanol producers generally received thirty days of credit, but more recently, ethanol producers were generally required to pre-pay for their inputs. This decrease in available credit increased ethanol producers' working capital needs. During the same period, however, capital also grew increasingly difficult to secure. In the past, ethanol producers forward-priced their ethanol. Within the past two years, ethanol producers have generally index-priced their ethanol on the date of shipment. Without forward pricing, ethanol producers lacked forward margins with which they could approach lenders and secure capital. With both credit and capital constraints, industry participants had difficulty meeting their debt obligations and obtaining financing.

In addition, ethanol prices and margins were low relative to prior years. Lower ethanol prices likely resulted from (1) decreased ethanol demand due to the economic climate and (2) increased ethanol supply as newly-constructed ethanol plants began production. Lower prices combined with higher input costs (primarily natural gas and corn) led to compressed ethanol margins. In conjunction with the credit and capital constraints discussed above, lower margins led some firms to idle plants or, in extreme cases, to file for bankruptcy.

Despite the low-margin environment, however, domestic production increased. Producers brought plants online that were already under construction, continued to run existing plants either close to or at capacity in many cases, and generally did not close plants permanently. Margins have recently started to recover (although they are still low relative to their peak in 2006), and some firms either have brought, or expect to bring, idle capacity back online.

New plant construction slowed in 2009. As market conditions worsened, several firms abandoned or delayed existing plans to begin new construction. With distressed assets available for purchase, industry participants believe that expanding capacity through acquisition is currently more cost-effective than new construction.

While there is enough ethanol production capacity in existence and under construction to meet the RFS minimums for the next few years, additional capacity will be necessary to meet future RFS mandates established by the 2007 legislation. In addition to investment in the construction of traditional ethanol plants, investment continues in the research and development of cellulosic ethanol production. If the technology sufficiently advances to produce cellulosic ethanol economically, then large-scale investment in the commercial scale production of cellulosic ethanol is likely to follow.

III. Summary of Market Concentration Trends

Since last year's report, both ethanol production and production capacity have increased. The potential concentrating effect from reduced new construction – meaning fewer firms brought new capacity online, relative to years past – seems to have been offset by a few large-firm bankruptcies. These bankruptcies led to the redistribution of existing capacity to more firms, resulting in an overall deconcentrating effect on the industry.

Domestic ethanol production increased approximately 38 percent between 2007 and 2008, from 6.5 billion gallons to 9 billion gallons.¹⁰ This increase came on the heels of an approximately 33 percent increase between 2006 and 2007.¹¹ Production has increased 563

¹⁰ See Renewable Fuels Association (“RFA”), *Growing Innovation: Ethanol Industry Outlook 2009* (“Growing Innovation”) at 3.

¹¹ See *Growing Innovation* at 3.

percent since 2000, when domestic ethanol production was 1.6 billion gallons.¹² With additional supply expected from new plants completed in 2008 and through September 2009, domestic production for 2009 will likely increase once again and exceed domestic production for 2008.

Domestic ethanol production capacity rose between 2007 and 2008, from 7.8 billion gallons¹³ to 12.5 billion gallons.¹⁴ The amount of capacity currently under construction, once online, will bring domestic production capacity for 2009 to 14.5 billion gallons.¹⁵

The number of firms producing ethanol has remained the same since last year's report. As of September 2009, 160 firms were producing ethanol or expected to produce ethanol within the next year. The largest ethanol producer's share of domestic capacity remained the same at 11 percent of domestic ethanol production capacity,¹⁶ down from 16 percent in 2007, 21 percent in 2006, 26 percent in 2005, and 41 percent in 2000.¹⁷

¹² *Id.*

¹³ *Id.*

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ Unless indicated otherwise, measures of capacity in this report represent both current capacity and capacity under construction. 2008 Ethanol Report at 5 (indicating the largest producer accounted for 11 percent of domestic production capacity).

¹⁷ See 2007 Ethanol Report at 6; Changing the Climate, table entitled "U.S. Fuel Ethanol Industry Biorefineries and Production Capacity."

IV. Analysis¹⁸

Section 1501(a)(2) of the Energy Policy Act of 2005 instructs the Commission to measure concentration in ethanol production using HHIs. The Commission and the U.S. Department of Justice regularly use HHIs to measure concentration in a relevant antitrust market to analyze the likely effects of a merger or acquisition on competition in that market.¹⁹ HHIs are calculated by summing the squares of the individual market shares of all market participants.²⁰ HHIs show a snapshot of market concentration and, in the context of merger review, the difference between the pre-merger HHI and post-merger HHI suggests the merger's likely effect on market concentration.²¹

To calculate the HHIs required by Section 1501(a)(2), we must assume that U.S. fuel ethanol production is a relevant antitrust market.²² This assumption precludes consideration of

¹⁸ The background information in this section on how HHIs are calculated and their relevance is consistent with the background information in last year's Report on Ethanol Market Concentration. *See* 2008 Ethanol Report at 6-7.

¹⁹ *See* Horizontal Merger Guidelines.

²⁰ For example, a four-firm market with market shares of 30 percent, 30 percent, 20 percent, and 20 percent has an HHI of 2600 [(30*30) + (30*30) + (20*20) + (20*20) = 2600]. HHIs range from 10,000 in a one-firm (pure monopoly) market, to a number close to zero in a highly unconcentrated market.

²¹ *See* footnote 5, *supra* (discussing the HHI threshold levels for characterizing a market as unconcentrated, moderately concentrated, or highly concentrated under the Horizontal Merger Guidelines).

²² A relevant antitrust market has both product and geographic aspects. A product market is a product or group of products such that a hypothetical firm that was the only seller of those products would find it profitable to impose at least a small but significant and nontransitory price increase above the competitive level. If such a price increase would not be profitable because of the loss of sales to other products, the product or group of products would not be a relevant product market. Similarly, a geographic market is a region such that a hypothetical firm that was the only seller of the relevant product in that region would find it profitable to impose at least a

potentially smaller relevant geographic markets within the United States that could provide further insight into how ethanol producers compete. This assumption also precludes consideration of a broader product market that includes other gasoline blending components that might be economically viable and environmentally acceptable substitutes for ethanol. It is likely that ethanol competes with other blending components, in which case concentration as measured by HHIs in ethanol production would understate the amount of competition ethanol producers face.

As in previous reports, FTC staff calculated HHIs for the ethanol industry using different measures of concentration. First, staff measured the market share for each producer based on the producer's production capacity and, alternatively, its actual production. Staff then performed separate HHI calculations using three different market share allocation methods that attribute the respective market shares based on production capacity and, alternatively, actual production to: (1) the producer itself; (2) the firm that actually marketed the producer's ethanol output; and (3) the marketing firm only when marketing the producer's volumes pursuant to a pooling agreement. Under each of these measures, the industry's HHIs declined in 2009.

small but significant and nontransitory price increase above the competitive level. If such a price increase would not be profitable because of the loss of sales to sellers outside the region, the region would be too narrowly defined to be a relevant geographic market. *See* Horizontal Merger Guidelines §§ 1.1-1.2.

A. Concentration with Market Shares Based on Production Capacity

1. *Attributing Market Shares to Producers*

Staff first calculated market shares of producers based on their fuel ethanol production capacity. Production capacity provides a useful and easily confirmable indicator of a producer's competitive significance.²³

Staff relied on publicly available information and interviews with producers, marketers, and other industry participants to determine the production capacity of each ethanol plant (as well as other information presented herein). On its website, the RFA provides updated data on ethanol plant capacity and announced capacity expansions. Other publicly available information is available from the producers' websites, many of which provide information regarding existing plant capacities and construction plans. Some marketers also publicly announce new agreements with producers.

In determining the capacity of individual producers, staff included the capacity of new plants under construction and expansions of existing plants under construction. Staff considered plants or expansions to be under construction only if the firm had finalized its construction plans, received necessary financing for the construction, and begun physical construction. Once a new plant or expansion project has reached this stage, completion is likely within twelve to eighteen months. Including the capacity from such projects in the current market is consistent with the approach adopted in the Horizontal Merger Guidelines.²⁴

²³ See Horizontal Merger Guidelines § 1.41. A firm's capacity is likely the best measure of its competitiveness because ethanol is an undifferentiated product (*i.e.*, producers manufacture chemically identical ethanol).

²⁴ See *id.* § 1.32. The Horizontal Merger Guidelines specifically discuss "uncommitted entrants" as being in the relevant market. Uncommitted entrants are those firms that are not

Under this approach, which allocates market share to each producer based on the producer's percentage of total production capacity, the HHI is 241, unconcentrated under the Horizontal Merger Guidelines.²⁵ This represents a decrease from the HHI of 313 that staff calculated in last year's report,²⁶ as well as from the HHI of 292 reported in 2007.²⁷

2. *Attributing Market Shares to Marketers*

The second measure of concentration is also based on production capacity but attributes each producer's capacity to the firm marketing its ethanol. Many producers enter into marketing agreements with third parties to market their ethanol to customers, while others sell their output directly. For those producers that engage in direct sales, as in the first method, staff attributed the market shares to the producers themselves.²⁸

Because one marketer may represent and make limited decisions for numerous individual producers, the marketer essentially aggregates these producers' capacities under a single entity.

currently producing or selling, but would within one year without the expenditure of significant sunk costs of entry and exit, in response to a small but significant and nontransitory price increase. While firms with plants under construction are not technically uncommitted entrants, they pose similar constraints on the ability of current producers or sellers to raise prices.

²⁵ This number suggests an analytic precision that does not reflect the rate of change in this industry, particularly as producers announce with seeming frequency their capacity additions, new plants, and cancellations of plans to build new capacity. Staff's HHI calculations represent staff's best estimate of the industry's concentration as of September 2009, the cut-off date for our analysis unless otherwise indicated. This approach therefore excludes any more recent information publicly available from RFA.

²⁶ 2008 Ethanol Report at 9.

²⁷ 2007 Ethanol Report at 9.

²⁸ In some instances, staff was unable to determine whether a producer marketed for itself or used an outside marketing firm. In these instances, staff attributed market shares to the producers themselves.

Thus, for purposes of competitive analysis, attributing producers' capacities to the marketers, rather than to the producers themselves, provides a measure of industry concentration that captures this aggregation.

This approach yields an HHI of 547, unconcentrated under the Horizontal Merger Guidelines and well below last year's HHI of 723²⁹ as well as the 2007 HHI of 670 using the same allocation method.³⁰

3. *Attributing Market Shares to Marketers with Pooling Agreements*

Some marketers utilize pooling arrangements, under which they make more significant decisions for their producer clients. Under these agreements, they market their producers' volumes in common, rather than individually, make sales to accounts, and decide which plant is best situated to serve a particular account. Each producer is allocated a prorated share from the common revenue pool based on the volume it contributes and receives an identical netback (the sale price less the cost of transportation from the ethanol plant), regardless of where the plant is located or where its ethanol is sold. Each producer receives offers only from its marketer, which also represents numerous other producers. By contrast, under a non-pooling marketing arrangement, the marketer sells its producers' volumes on a plant-specific basis and can present each producer with offers from multiple buyers.

Since buyers do not make offers to individual producers within a pooling arrangement and deal only with the single marketer, it may make sense to attribute production capacity to the marketers only for those producers in pooling arrangements. Those producers in non-pooling

²⁹ 2008 Ethanol Report at 11.

³⁰ 2007 Ethanol Report at 11.

marketing arrangements are credited with their own production for purposes of determining market shares. Measured in this way, the HHI is 296, unconcentrated under the Horizontal Merger Guidelines. It represents a relatively large decrease from last year's HHI of 527³¹ and remains below the 2007 HHI of 453.³²

B. Concentration with Market Shares Based on Production, Using Data from the Energy Information Administration ("EIA")

Staff also measured industry concentration in terms of actual production rather than capacity. Using production (rather than capacity) data is instructive because capacity data have certain limitations, particularly insofar as stated capacity does not necessarily represent actual production capabilities. Ethanol plants often can produce as much as 10 to 15 percent more than their stated design capacities³³ and tend to do so as their owners and operators improve the production process and gain expertise in operating their plants. In this respect, actual production may reflect concentration more accurately than design capacity.

EIA provided the actual production HHIs contained in this report. EIA collects confidential information from firms that produce oxygenates such as ethanol. Firms that produce over eight million gallons of oxygenates per year must report to EIA their monthly production volumes by product. Since the production data are confidential, EIA provided only the aggregated HHI numbers to FTC staff and did not disclose the volumes of ethanol attributed

³¹ 2008 Ethanol Report at 10.

³² 2007 Ethanol Report at 11.

³³ 2008 Ethanol Report at 11; 2007 Ethanol Report at 12; 2006 Ethanol Report at 9; 2005 Ethanol Report at 12.

to each producer or marketer.³⁴ The EIA figures are based on production from July 2008 through June 2009.

There are some limitations to the accuracy of HHI numbers based on actual production, just as there are limitations to HHIs based on capacity. The HHIs based on production may overstate or understate actual concentration due to entry and exit of firms over the period as measured by EIA. Specifically, the HHIs based on production do not fully reflect the deconcentrating impact of new facilities that began production during this period, nor do they fully reflect the concentrating impact of facilities that were idled or shut down during the period. In both cases, these facilities will have produced only a fraction of what they would likely produce in a full year, leading to an understatement (in the case of new facilities) or overstatement (in the case of idled facilities) of their impact on the HHIs based on production. Furthermore, such HHIs look only at actual production and do not account for expansions and new facilities under construction but not yet in operation.³⁵ Consequently, HHIs based on actual production may overstate or understate industry concentration.

Based on actual production, the HHI is 232, if market shares are attributed to the individual producers. If market shares of each producer are attributed to the firm that markets for each producer, the HHI is 722. Finally, if market shares of each producer are attributed to the firm that markets the production only when the marketing is done pursuant to a pooling

³⁴ For producers for which EIA maintains production data, staff provided EIA with information regarding the identity of those producers' marketers, and with information regarding whether they entered into pooling agreements with their marketers. EIA used this information, in conjunction with its own data on ethanol production, to calculate the HHIs that attribute market share to marketers.

³⁵ 2008 Ethanol Report at 12.

agreement, the HHI is 305. These HHIs based on actual production are all lower than the comparable figures in last year's report. Last year, the HHI based on actual production was 376 when market shares were attributed to each producer, 952 when market shares were attributed to marketers of each producer, and 658 when market shares were attributed to marketers utilizing pooling agreements and, otherwise, attributed to the individual producers.³⁶ Thus, concentration based on both production capacity and actual production has decreased since last year.

The HHI figures presented above, regardless of the particular measure used, indicate that ethanol production in the United States is unconcentrated.

C. Ease of Entry and Imports

The ease of entry and imports also strongly supports a conclusion that domestic ethanol production is unconcentrated. For example, new ethanol production facilities began operation in the past year, and additional facilities are scheduled to begin operating in the coming year. In addition, ethanol imports into the U.S. from foreign sources are significant. In 2008, the U.S. imported an estimated 600 million gallons of ethanol, down from the record 653 million gallons imported in 2006³⁷ but still substantially higher than in prior years.³⁸ The ability of new firms to enter the market quickly and import ethanol in response to increased demand demonstrates that firms likely do not have the ability to engage in anticompetitive behavior, even if domestic ethanol production were more concentrated than it is at the present. In other words, the threat of

³⁶ *Id.*

³⁷ <http://www.ethanolrfa.org/industry/statistics/#F>.

³⁸ The U.S. imported 436 million gallons of ethanol in 2007, 136 million gallons of ethanol in 2005, and 160 million gallons of ethanol in 2004. *Id.*

entry by domestic producers and the presence of imports corroborate the evidence of the low HHIs that domestic ethanol production is unconcentrated.

V. Conclusion

Ethanol production has remained unconcentrated over the last year. Regardless of how concentration is measured, the industry trend toward less concentration observed in prior years has continued. While firms generally did not begin new construction in 2009, additional ethanol production capacity already in progress is likely to become operational in the next twelve to eighteen months. Furthermore, potential entry by new firms and the availability of ethanol imports provide additional constraints on current market participants. These dynamics make it extremely unlikely that a single ethanol producer or marketer or a small group of such firms could wield sufficient market power to successfully engage in price-fixing or other anticompetitive behavior.

Figure 1: Domestic Fuel Ethanol Concentration

Concentration Based on Capacity	2008 HHI³⁹	2009 HHI
Shares attributed to each producer	313	241
Shares attributed to marketers for all marketing agreements	723	547
Shares attributed to marketers only for pooling agreements	527	296

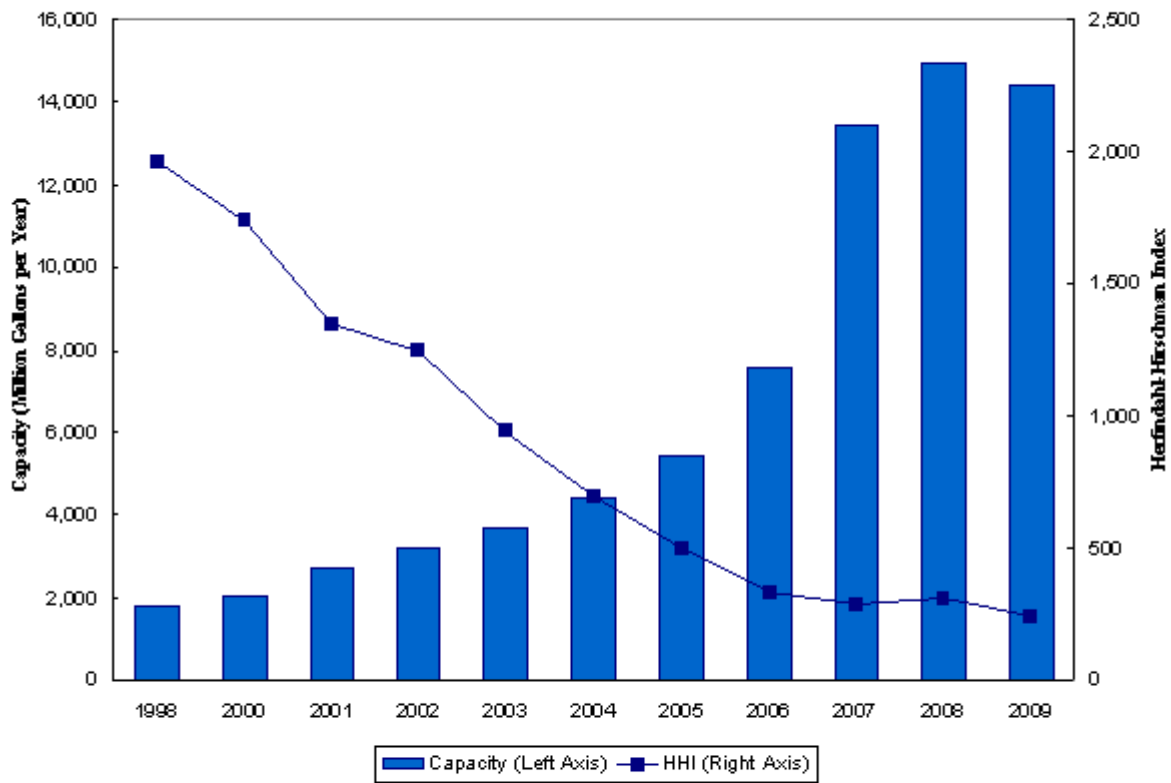
Concentration Based on Production	2008 HHI	2009 HHI
Shares attributed to each producer	376	232
Shares attributed to marketers for all marketing agreements	952	722
Shares attributed to marketers only for pooling agreements	658	305

Source: RFA, EIA

Note: Capacity for 2008 includes the capacity as of September of 2008 and the capacity additions under construction and expected to be completed within 12-18 months of September 2008. Capacity for 2009 includes the current capacity as of September 2009 and the capacity additions under construction and expected to be completed within 12-18 months of September 2009. Production data for 2008 are from July 2007 through June 2008, and production data for 2009 are from July 2008 to June 2009.

³⁹ As discussed in footnote 5 above, the Commission and the Department of Justice characterize markets having HHIs below 1000 as unconcentrated. HHIs between 1000 and 1800 indicate moderately concentrated markets, and HHIs over 1800 indicate highly concentrated markets that are more likely to pose competitive concerns. Horizontal Merger Guidelines § 1.51.

Figure 2: Historical Fuel Ethanol Capacity and HHIs



Source: RFA

Note: Annual figures are for operating capacity and capacity under construction at year-end for 1998 to 2004, and as of October for 2005 to 2009. This is a departure from the similar figure found in reports from 2005-2007. In those years, the capacity and HHI figures were plotted only for operating capacity and excluded capacity under construction. Capacity under construction was included in the last year of the figure with a (P) to denote anticipated operating capacity in the forthcoming year.