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November 8, 2018

VIA HAND DELIVERY AND ECFS

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: ***In the Matter of Misuse of Internet Protocol (IP) Captioned Telephone Service; Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*** **– CG Docket Nos. 13-24 and 03-123 – Request for Highly Confidential Treatment**

Dear Ms. Dortch:

Pursuant to the Third Protective Order in the above-captioned proceedings[1] ClearCaptions, LLC ("ClearCaptions" or "Company") hereby requests Highly Confidential treatment of certain information contained in the enclosed Notice of Ex Parte (including attachments). As described below, this filing contains information that is properly designated as Highly Confidential Information under Appendix B of the Third Protective Order and is proprietary and business information that is not customarily disclosed to the public or within the industry and is subject to Exemption 4 of the Freedom of Information Act ("FOIA").[2] In accordance with paragraph 2 of the Third Protective Order, ClearCaptions has received the written approval of the Commission

[1] *In the Matter of Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities; Structure and Practices of the Video Relay Service Program; Misuse of Internet Protocol (IP) Captioned Telephone Service*, Order and Third Protective Order, CG Docket Nos. 03-123, 10-51, and 13-24, DA 18-751, Appendix A (rel. July 20, 2018) ("Third Protective Order").

[2] Third Protective Order Appendix B; 5 U.S.C. § 552(b)(4).

Staff to designate certain information provided herewith as Highly Confidential.[3] The Highly Confidential Information has been redacted from the public version of this filing, which is being filed in the Commission's Electronic Comment Filing System in the referenced dockets.[4]

As this information is submitted voluntarily and absent any requirement by statute, regulation, or the Commission, ClearCaptions requests that, in the event that the Commission denies the Company's request for confidentiality, the Commission return the materials without consideration of the contents therein.[5]

In support of this request, ClearCaptions provides the following information:[6]

(1) Identification of the specific information for which confidential treatment is sought

ClearCaptions hereby seeks Highly Confidential treatment for all of the information in the enclosed Notice of Ex Parte (including attachments) that is contained after the notation *****BEGIN HIGHLY CONFIDENTIAL***** and before the notation *****END HIGHLY CONFIDENTIAL*****, which is properly designated as Highly Confidential Information under paragraphs 3 and 4 of Appendix B of the Third Protective Order.[7]

(2) Identification of the Commission proceeding in which the information was submitted or a description of the circumstances giving rise to the submission

The attachments to the Notice of Ex Parte were provided to the identified FCC Staff during the meetings reported in the Notice of Ex Parte.

(3) Explanation of the degree to which the information is commercial or financial, or contains a trade secret or is privileged

The subject information concerns "current or future costs, revenues . . . [and] market share" as specified in paragraph 3 of Appendix B of the Third Protective Order as well as information "describing or illustrating how [ClearCaptions] analyzes its competitors" as specified in paragraph 4 of Appendix B of the Third Protective Order.[8] Further, this information constitutes

[3] Third Protective Order ¶ 2.

[4] *Id.* ¶ 4.

[5] 47 C.F.R. § 0.459(e).

[6] *Id.* § 0.459(b).

[7] Third Protective Order Appendix B ¶¶ 3-4.

[8] *Id.*

proprietary commercial and business information under Exemption 4 of the FOIA.[9] Accordingly, the Company hereby requests that this information be treated as Highly Confidential Information under the Third Protective Order and not be made routinely available for public inspection.

(4) Explanation of the degree to which the information contains a service that is subject to competition.

The Highly Confidential Information pertains to the Company's provision of Internet Protocol Captioned Telephone Service ("IP CTS"), a nationwide competitive service.

(5) Explanation of how disclosure could result in substantial competitive harm.

Disclosure of the Highly Confidential Information to the public or to competitors of ClearCaptions would "allow those persons to gain a significant advantage in the marketplace or negotiations."[10] The presence of competitors in the IP CTS market and the likelihood of competitive injury to ClearCaptions threatened by release of this information should compel the Commission to withhold the information designated as Highly Confidential Information from public disclosure. The Commission has provided assurances that it is "sensitive to ensuring that the fulfillment of its regulatory responsibilities does not result in the unnecessary disclosure of information that might put its regulatees at a competitive disadvantage."[11]

(6) Identification of any measures taken by the submitting party to prevent unauthorized disclosure

In order to prevent unauthorized disclosure of the subject information, ClearCaptions is hereby submitting a request that the subject information be treated as Highly Confidential Information indefinitely, and ClearCaptions has obtained Commission Staff's written approval to designate the subject information as Highly Confidential Information pursuant to paragraph 2 of the Third Protective Order.[12] ClearCaptions takes routine measures to ensure the confidentiality of this information during normal business operations, including instructing its employees and contracting partners not to disclose such information outside of ClearCaptions, and restricting access to this information internally.

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[9] 5 U.S.C. § 552(b)(4).

[10] Third Protective Order ¶ 2.

[11] *In the Matter of Examination of Current Policy Concerning the Treatment of Confidential Information Submitted to the Commission,* Report and Order, GC Docket No. 96-55, FCC 98-184, 13 FCC Rcd 24816, ¶ 8 (rel. Aug. 4, 1998).

[12] Third Protective Order ¶ 2.

(7) Identification of whether information is available to the public and the extent of any previous disclosure of the information to third parties

The subject information is not ordinarily available to the public or to any third parties.

(8) Justification of the period during which the submitting party asserts that material should not be available for public disclosure

As described above, the subject information contains highly sensitive ClearCaptions cost and other information covered by paragraphs 3 and 4 of Appendix B to the Third Protective Order that could cause significant competitive injury to ClearCaptions if disclosed.[13] Additionally, the information constitutes proprietary commercial and business information or confidential materials not routinely available for public inspection under Exemption 4 of the FOIA.[14] Disclosure of this information would cause significant competitive injury to ClearCaptions if disclosed. For this reason, ClearCaptions respectfully requests that the Commission protect this information from public disclosure indefinitely.

(9) Any other information that the party seeking confidential information believes may be useful in assessing whether its request for confidentiality should be granted

As the subject information is being submitted voluntarily, ClearCaptions requests that, in the event that the Commission denies ClearCaptions' request for confidentiality, the Commission return the materials without consideration of the contents therein.

Should you have any questions concerning the foregoing request, please contact the undersigned.

[13] Third Protective Order Appendix B ¶¶ 3-4.

[14] 5 U.S.C. § 552(b)(4); 47 C.F.R. § 0.457.

Respectfully submitted,

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cc: Chairman Ajit Pai
Michael Carowitz
Eric Burger

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Re: ***In the Matter of Misuse of Internet Protocol (IP) Captioned Telephone Service; Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*** **– CG Docket Nos. 13-24 and 03-123 – Notice of Ex Parte**

Dear Ms. Dortch:

On November 6, 2018, Robert Rae, President and CEO of ClearCaptions, LLC ("ClearCaptions" or "Company"), Michael Strecker, Vice President of Regulatory and Strategic Policy for ClearCaptions and Paul C. Besozzi, outside counsel for ClearCaptions, met separately with Chairman Ajit Pai and Michael Carowitz, Special Counsel to Chairman Pai, to discuss key issues concerning Internet Protocol Captioned Telephone Service ("IP CTS"), with a focus on alternatives for compensation rates for IP CTS currently being considered under the Commission's Further Notice of Proposed Rulemaking.[1] In connection with this meeting, the Company provided

[1] *In the Matter of Misuse of Internet Protocol (IP) Captioned Telephone Service; Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*, Report and Order, Declaratory Ruling, Further Notice of Proposed Rulemaking, and Notice of Inquiry, CG Docket Nos. 13-24 and 03-123, FCC 17-89 (rel. June 8, 2018) ("R&O" or "FNPRM," as appropriate).

the attached slide deck regarding IP CTS rates[2] and the attached expert report in rebuttal to a proposal by CaptionCall, LLC to hold a reverse auction to set IP CTS rates.[3]

During the course of the meeting, ClearCaptions reviewed the points made on each of the slides in Exhibit 1 regarding the IP CTS industry and market structure, ClearCaptions' costs and position in the market, estimates of market growth and shares, the import and impact of a flat rate based on weighted average industry costs per minute, including the interim rates set by the Commission in the R&O, the importance of scale in understanding IP CTS and in considering rate setting alternatives, and the Company's opposition to the use of reverse auctions to set IP CTS rates.[4] Throughout, the Company reiterated its continued support for its proposed multi-tiered rate structure to compensate IP CTS providers in lieu of rate proposals offering a single rate for all providers.[5] The Company also addressed its previously-provided views on Automatic Speech Recognition ("ASR") technology, the status of its development and the potential impact of such technology on IP CTS rates. Finally, ClearCaptions committed to working with the Commission on other issues raised in the FNPRM as the process moves forward.

ClearCaptions also inquired as to the status of its partial waiver request relating to certain 911 obligations filed on March 2, 2018.

On the same day, Mr. Rae met individually and separately with Eric Burger, Chief Technology Officer, Office of Strategic Planning and Policy Analysis, to generally review IP CTS. Mr. Rae provided Mr. Burger with a copy of Exhibit 1 and, based thereon, a general overview of the IP CTS industry, including the current market structure. He also generally discussed ClearCaptions' business approach and position in the industry, along with the prospects for, and ClearCaptions' efforts related to, development and deployment of ASR technology for IP CTS.

This notice is filed in accordance with Section 1.1206(b) of the Commission's rules.[6]

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[2] *See* Exhibit 1.

[3] *See* Rebuttal Report of David J. Salant, dated October 31, 2018, which is Exhibit 2, responding to *Comments of CaptionCall, LLC*, CG Docket Nos. 13-24 and 03-123 at 72-77 and Appendix D (filed Sept. 17, 2018).

[4] *See* Exhibit 2.

[5] *See, e.g.*, *Initial Comments of ClearCaptions, LLC*, CG Docket Nos. 13-24 and 03-123, at 11-23 (filed Sept. 17, 2018); *Reply Comments of ClearCaptions, LLC*, CG Docket Nos. 13-24 and 03-123, at 5-6 (filed Oct. 16, 2018); *see also* Exhibit 1 at slides 8-9.

[6] 47 C.F.R. § 1.1206(b).

Respectfully submitted,

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Counsel for ClearCaptions

Enclosures

cc: Chairman Ajit Pai
Michael Carowitz
Eric Burger

Exhibit 1
IP CTS rates slide deck
dated November 5-6, 2018

IP CTS Rate Discussion

November 5th and 6th, 2018

ClearCaptions

REDACTED – FOR PUBLIC INSPECTION

Key Points

- IP CTS, similar to VRS, has **significant fixed costs** that must be overcome
  - Positive operating margins for an IP CTS provider at $1.95 rate began at ***BEGIN HIGHLY CONFIDENTIAL*** ***END HIGHLY CONFIDENTIAL***
- Industry **average weighted cost** is effectively CaptionCall's cost as it's estimated they own greater than ***BEGIN HIGHLY CONFIDENTIAL*** ***END HIGHLY CONFIDENTIAL*** market share and massive economies of scale
  - By targeting 8% to 12% operating margins from average weighted costs, a race to scale has formed in the industry – CaptionCall to maintain this cost leadership; others to gain scale to survive reducing rates
- In IP CTS, **massive scale equals extreme profitability and resources**
  - CaptionCall has the most resources to invest in growth and therefore is driving IP CTS's rapid growth
- **Reverse auctions and flat rates only reinforce this imbalance** and will most likely drive all providers, other than the dominant provider, into weaker cost structures driven by scale disadvantages
- A **multi-tiered structure**, however, removes excess growth resources from the dominant provider, **provides a sensible profit margin to all players**, and facilitates ongoing investment in quality, technology, and fosters competition

ClearCaptions Overcomes Start-up Costs and Entered Profitability Just In Time for Rate Reductions

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- Growth eventually overcomes fixed costs, which are significant in the early stages, but are later minimized by scale
- Current interim rate glide path forces small providers to focus on growth over all other components in order to financially remain viable
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- At CaptionCall's scale, there is no rush to grow to stay ahead of rates, but there is pressure to grow now and remain the dominant provider

Rapid Growth of One Provider is Materially Driving the Growth in the Industry

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- During this period ClearCaptions has operated at ***BEGIN HIGHLY CONFIDENTIAL*** ***END HIGHLY CONFIDENTIAL***
- Hamilton and Sprint, while having greater scale than ClearCaptions, are hampered by their reseller model
  - CaptionCall experienced an estimated positive operating margins during this time of ***BEGIN HIGHLY CONFIDENTIAL*** ***END HIGHLY CONFIDENTIAL***

Proposed Industry Cost Curve and Actual Results

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- As can be seen in the above chart, IP CTS has significant fixed costs that must be overcome with volume; as providers gain sufficient volume, these fixed costs become a much smaller % of their overall operating expense

Interim Flat Rates Constrict or Eliminate Profitability for the Smaller Providers While Continuing to Overcompensate the Dominant Provider

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- Current interim rates keep small providers operating near or below breakeven, while at the same time, they overcompensate the largest provider resulting in excessive margins and allow high investment in growth

Proposed Reverse Auction Model Will Eliminate Competitors from IP CTS

- Instead of providing the smaller or emerging providers an opportunity to achieve the necessary economies of scale, a reverse auction will drive them out of the industry and will lead to either a duopoly or monopoly
- Since scale advantage cannot be overcome with technology, remaining providers will have less incentive to invest in R&D and quality
- With only 2 or 3 providers surviving the first auction, there will be less incentive for those providers to lower their costs in subsequent auctions
- As competition declines over time, rates will ultimately increase
- Since the IP CTS market lacks maturity and there remains substantial economies of scale opportunities, a reverse auction is not optimal for the industry or the fund

Proposed Multi-tier Rate Structure

4 Tier Model					
	Minute Threshold			Tier Min Value	Proposed Value
Tier 1		to	3,500,000	3,500,000	1.9467
Tier 2	3,500,000	to	7,000,000	3,500,000	1.4289
Tier 3	7,000,000	To	10,000,000	3,500,000	1.2475
Max Tier	10,000,000	>			1.0403

- ClearCaptions continues to support a multi-tier rate strategy as the best way to enable constrained Fund growth, technology investment, and ongoing competition
- ***BEGIN HIGHLY CONFIDENTIAL***
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- ClearCaptions encourages the FCC to perform their own analysis of provider costs at various scales to appropriately adjust tiers and rates with a larger sample
- As additional technology advancements such as ASR gain traction, there will be room for a further reduction across all tiers

Multi-Tiered Rates Allow for Competition and Ensure Reasonable Operating Margins

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- A multi-tiered rate methodology drives efficiencies and ensures providers only earn reasonable margins, thus preventing providers from overinvesting in growth and allowing for market competition – it also allows providers to invest and reduce costs further over time

4 Tier Model is More Efficient than Interim Rates

		Fund Year 2018/2019	Industry Realized Rate
Minutes		499,177,652	
Interim Rates	$	873,560,892	$1.75
4 Tier Model	$	718,632,267	$1.44
Savings to the Fund	**$**	**154,928,625**	

- The proposed 4 Tier Model results in an additional $154M in savings to the fund above and beyond the 2018/2019 Interim Rates
- The proposed 4 Tier Model results in a $1.44 Industry realized rate, which is $.14 per minute, or approximately 9% less than the year 2 interim rate of $1.58
- The proposed 4 Tier Model automatically drives year over year reductions as providers grow scale, enabling this advantage to be passed back to the fund; the only way a provider can exceed 8% to 12% margins is to find ways to drive additional efficiency other than scale
- With each provider having equal profit potential, all providers can invest adequately in constrained growth, service quality, and new technology

Exhibit 2
Rebuttal Report of David J. Salant
dated October 31, 2018

REBUTTAL REPORT OF DAVID J. SALANT

DAVID J. SALANT, PH.D.

October 31, 2018

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

1. This report provides an analysis of the IP CTS market and Dr. Andrzej Skrzypacz's proposed design of reverse auction for setting IP CTS rates. Adopting a reverse auction to set IP CTS rate would be short-sighted, as it tends to reduce short run costs in exchange for consolidation, higher long run costs, lower market penetration, and less investment.
2. The IP CTS market is featured by imbalanced market shares, significant fixed costs and economies of scale, and increasing demand from an aging population. Demand in this market is driven by FCC regulation. Additionally, the FCC's rate setting mechanism largely determines the supply.
3. A well-designed IP CTS rate-setting mechanism should not keep down the subsidy level in the short run at the expense of long run competition and reduced incentives for suppliers to invest in R&D and marketing.
4. Dr. Skrzypacz's proposed auction will likely to select the two or three lowest average cost suppliers at the time of auction. Small suppliers, who may be newer to the market, are disadvantaged in the auctions because of their scale. This can drive the smaller suppliers out of the market, resulting in less competition in the long run. The proposed auction is unlikely to achieve the socially most efficient outcome, as previous literature demonstrates that market structure should be determined endogenously when social welfare can be enhanced by increasing competition.
5. The IP CTS market lacks the maturity for reverse auctions. Even the best designed auctions can have adverse long-term impacts on competition. An example is provided to illustrate how a reverse auction can lead to consolidation and hurt consumers in the long run. Alternative

mechanisms such as a tiered rate model that give small suppliers an opportunity to grow their scales should be considered for rate-setting in the IP CTS market.

II. OVERVIEW OF THE IP CTS MARKET

Imbalanced Market Shares

6. The IP CTS market includes five primary suppliers, which vary in size and technology employed, resulting in there being differences in cost structures among them. The largest supplier has a significant cost advantage over the next two rivals due to its scale. The next two largest suppliers are resellers of the same service and should have similar costs between them. The fourth supplier is one-half to one-quarter the size (and newer to the market) and the fifth is smaller still.

Significant Fixed Costs and Economies of Scale

7. The provision of IP CTS service entails significant upfront fixed costs. Moreover, owing to the slow process of signing up customers along with customer churn, it can take several years for a firm to reach a viable level of scale.

Demand of IP CTS is Driven by Non-Price Factors

8. Government regulation provides for IP CTS customers to pay zero net cost per minute for IP CTS. The IP CTS is solely subsidized and funded from the interstate TRS fund. Therefore, total consumer demand in this market is solely driven by non-price factors such as marketing, fixed costs for consumers to set up service, and quality of service.

9. The demand for IP CTS is expected to increase as the aging of the population increases the number of consumers with hearing disabilities.

Supply of IP CTS is largely determined by FCC's Compensation Mechanism

10. Further, on the supply side, the only providers are those who are certified to receive FCC subsidies. So, the FCC largely determines the market structure. The supply of IP CTS will also be driven by the per-minute compensation rate determined by the FCC. In considering the sustainability of the TRS fund, the rate should not be set excessively high such that the providers have excessive profits. On the other hand, a qualified provider can be driven out of the market if the rate is set below its average cost; low rate may force multiple suppliers out of the market.

III. POLICY OBJECTIVES OF THE FCC

11. The objectives of the FCC include incentivizing suppliers to provide high quality IP CTS services that enable consumers with hearing disabilities to become fully functioning members of society, consistent with the mandate of the Americans with Disabilities Act (ADA), while maintaining the size of TRS fund.
12. Given these objectives, it is important for the IP CTS rate-setting mechanism to incentivize service providers to invest in R&D and marketing so as to (i) improve efficiency (ii) maintain/increase service quality, and (iii) increase market penetration in the long run. This can best be achieved by promoting competition among service providers.
13. The mechanism design should take all the following objectives into account:
    - Keep down the subsidy per minute in the short run.
    - Promote higher quality of service and encourage R&D and marketing incentives in the long run.
    - Preserve customer services: existing customers should be able to use their current suppliers.

- Preserve the stability of the rates for existing service providers.
- Allow for the possibility of entry and limit the risk of exit.
- Minimize administrative costs for both suppliers and the FCC.

14. As the FCC can limit competition among suppliers, its policy for allocating subsidies should factor in both short run and long run effects.

IV. SUMMARY OF SKRZYPACZ PROPOSED AUCTION DESIGN

15. CaptionCall's expert, Dr. Andrzej Skrzypacz, proposed a reverse auction, a multi-round descending clock auction starting at a reserve price set by FCC. There's a new round-opening price for each round. Bidders submit binary bids (yes/no). The price will be reduced in the next round if there are more than one active bidders. The auction ends when there are fewer than two active bidders remaining in the auction.
16. When the auction ends, the winning rate is the rate from the previous round (i.e., the rate of the last round in which at least two bidders were active). All bidders active in the previous round to the closing round are winners. Any bidder who was active at the end of any round in which the rate was within x% of the winning rate are also deemed winners. Note that bidders are not informed of how many active bidders remain after any round during auction. They only know whether the auction is active or not.
17. Those bidders that are winning are entitled to obtain new subscribers (with no limits) at the winning rate. All suppliers, (including losing bidders), can continue serving their existing customers, also at the winning rate[1].

[1] Dr. Skrzypacz provides a discussion on alternative treatment of losing bidders that allows losing bidders to continue adding new users but only at a lower rate than the winning bidders. This alternative treatment will not change our analysis in Section V.

18. The proposed auction would be repeated annually. Entry of small suppliers and new suppliers is permitted between auctions; however, given the startup costs, exit of smaller suppliers may be more likely than entry of new ones.

V. COMMENTS ON THE PROPOSED AUCTION

A. Likely consequence of the proposed auction

19. This type of auction will tend to select the two lowest average cost bidders, or in this case three, in the initial auction, given that the second and third bidders provide the same service likely have similar costs. This will serve to minimize the subsidy in the short run.

20. Because this industry has high fixed costs and economies of scale, winning in the first auction will enable those three suppliers to further lower their average cost of providing IP CTS per minute until their economies of scale are exhausted.

21. The fourth and fifth suppliers would be disadvantaged in subsequent auctions because of their smaller sizes. It is inherently more difficult to reduce the average cost per minute when operating at a relatively low output level. This reduces the smaller firms' competitiveness in subsequent auctions. Even if they were to win in some subsequent auction, the number of new subscribers will be limited, as the three larger suppliers will be able to keep their existing subscribers. The fourth and fifth suppliers can be driven out of this industry.

22. The winning suppliers will face less competition and therefore have lower incentives to invest in R&D to further reduce their costs in any subsequent auction. After the losing suppliers are driven out of market, the remaining suppliers will have no competition in the future auctions. This increases the risk of collusive bidding. For example, the second and third suppliers could strategically drop out early in the auction to receive a higher compensation rate without any

risk of losing the auction. The remaining suppliers would also have less incentive to maintain or increase the quality of their service. This dynamic would hurt consumers in the long run.

23. In short, the current auction design seems predisposed to drive out the two smallest suppliers rather than giving them the opportunity to increase in scale, resulting in less competition in the future IP CTS market. The lack of competition will disincentivize large suppliers from investing in R&D to further reduce costs. They will also have less incentive to maintain or improve the quality of their service or marketing their services. For these reasons, the proposed auction, if implemented, would be unlikely to accomplish the FCC's objectives.

B. Market structure should be determined endogenously

24. The key flaw of the auction mechanism proposed by Dr. Skrzypacz is that it appears to be set up to drive the two smaller suppliers out of the market; it is hardwired to select only two or perhaps three unique winning bidders in each auction, a result that is unlikely to achieve the socially most efficient outcome. Given that the social welfare created in this industry depends on (i) the identity and costs of winning bidders and (ii) the market structure, there is no compelling reason to limit the number of winning bidders to just two or three.

25. This point is addressed in Milgrom's Nobel Prize lecture[2] and a journal article by Dana and Spier (1994)[3]. Milgrom characterizes an optimal auction mechanism for selecting suppliers to provide universal telephone service that balance the objective of promoting competition and keeping down subsidy costs. He shows that "the most striking aspect of an optimal auction is that it necessarily entails endogenous market structure. This means that the set of firms

[2] Milgrom, Paul. "Procuring Universal Service: Putting Auction Theory to Work." Nobel Prize Lecture on William Vickery at the Royal Swedish Academy of Sciences, December 9, 1996.

[3] Dana Jr., James D. and Spier, Kathryn E. "Designing a Private Industry: Government Auctions with Endogenous Market Structure." *Journal of Public Economics*, Volume 53, Issue 1, 127-147, January 1994.

participating in the market depends on the firm's cost characteristics, which is the private information of the firms." Dana and Spier (1994) characterize the optimal auction as one in which social welfare can be enhanced by increasing competition. They demonstrate that "the optimal government mechanism for auctioning production rights is one in which the market structure is endogenous, that is, the number of participants awarded production rights may depend on their bids."

C. The IP CTS market lacks maturity

26. Given that today the market lacks maturity, even Milgrom's auction is not optimal, as there remain substantial economies of scale, and suppliers are at different growth stages.

VI. PROBLEMS WITH REVERSE AUCTIONS IN GENERAL

A. Reverse auctions have adverse impacts on competition

27. Generally, Even the best designed auctions can have adverse long-term impacts on competition, investment, and overall costs of the IP CTS service. By selecting the lower-cost suppliers at the time of the auction, the higher-cost suppliers will be driven out of the market. An annual auction, or even an auction every two or three years, will tend to reduce short run costs in exchange for consolidation, higher long run costs, and less investment.

28. Given that IP CTS is a developing market, economies of scale are present, suppliers are at different stages of growth, and future technical development and R&D investments are crucial, a reverse auction is not an appropriate rate-setting mechanism to accomplish the FCC's objectives.

B. An Illustrative Example

29. The following example shows how a reverse auction can lead to greater market concentration, higher industry-wide average cost, and a lower provision of IP CTS services:

30. Suppose there are two suppliers, A and B. Supplier A has a larger scale than supplier B in Year 1. Assume further that, although supplier A has a lower *average* cost, due to its scale, supplier B has recently developed a superior technology that affords it a lower *variable* cost. The two suppliers' subscribers and cost information in Year 1 are presented below:

Table 1 – Subscribers and Costs of Supplier A and B in Year 1

Year 1	Subscribers	Fixed Cost	Variable Cost	Total Cost	Average Cost
Supplier A	1000	100	1	1100	1.10
Supplier B	200	100	0.8	260	1.30

31. If a reverse auction is conducted to select the lower cost supplier in Year 1, supplier A will likely to win the auction and add more subscribers. Supplier B will likely to lose the auction and lose its subscribers consequently. The market concentration will increase.

32. Suppose supplier A adds 500 subscribers and supplier B loses 100 subscribers in Year 2, after a reverse auction is conducted in Year 1[4]. The two suppliers' cost information in Year 2 are presented below:

Table 2 – Subscribers and Costs of Supplier A and B in Year 2 after Auction

Year 2	Subscribers	Fixed Cost	Variable Cost	Total Cost	Average Cost
Supplier A	1500	100	1	1600	1.07
Supplier B	100	100	0.8	180	1.80

[4] See Appendix A for a detailed explanation of why this is a Nash equilibrium after a reverse auction in Year 1.

33. As supplier A increases its scale, its average cost will be lower in Year 2. Supplier B's average cost will be higher in Year 2. The industry-wide average cost will be 1.11. The increased market share will give supplier A greater competition advantage in the future. Supplier B will likely to be driven out of the market without being given an opportunity to grow its scale.

34. If an alternative rate-setting mechanism that promotes the growth of both suppliers is used, then both suppliers will be able to add subscribers in Year 2. The competition between the two suppliers will be more intense, which will lead to greater marketing effort, higher service quality and more service options. The improved service quality and marketing activity will attract more subscribers, so the total number of subscribers in the market will be higher when the competition between the two suppliers is more intense.

35. Suppose supplier A adds 200 subscribers and supplier B adds 400 subscribers in Year 2 when there is no reverse auction in Year 1[5]. The two suppliers' cost information in Year 2 are presented below:

Table 3 – Subscribers and Costs of Supplier A and B in Year 2 without Auction

Year 2	Subscribers	Fixed Cost	Variable Cost	Total Cost	Average Cost
Supplier A	1200	100	1	1300	1.08
Supplier B	500	100	0.8	500	1.00

36. Both supplier A and B will be able to increase scales and reduce average cost in Year 2. The industry-wide average cost will be 1.06. Moreover, after growing its scales, supplier B will have a lower average cost than supplier A in Year 2. Therefore, more consumers will receive the IP CTS service at a lower industry-wide average cost when a reverse auction is not used.

[5] See Appendix A for a detailed explanation of why this is a Nash equilibrium after a tiered rate mechanism is used in Year 1.

VII. ADDITIONAL COMMENTS

A. Economies of scale has not been exhausted

37. The section of "Current Distribution of Costs and Market Share" in Appendix C by Dr. Michelle Connolly states that "a majority of providers are likely to already be producing at levels where they have already exhausted their scale economies." If all 3 lowest-cost suppliers are producing at levels that beyond the range for economies of scale, then they will not gain further cost advantages from winning the first few auctions. The early winners may have higher average costs after adding more subscribers. But, it is far from clear that Dr. Connolly is correct. And the FCC should not base its decision on less than hard evidence about where economies of scale kick in.

B. A tiered rate model should be considered

38. One subsidized market comparable to the IP CTS market is the Video Relay Service (VRS) market. This is also a developing market with economies of scales and unequal market shares among suppliers. According to FCC report and order on VRS rate in 2017, the dominant supplier in VRS market provided about 80% of the VRS minutes, and its two principal competitors each provided another 5% to 10%. This market structure is largely unchanged since 2013.

39. Based on the cost and market structure, the FCC adopts a tiered structure for the next four years in 2017 in order to reflect the per-minute cost differentials between small, mid-level, and large VRS providers. Under the tiered rate structure, a VRS provider's monthly compensation payment is calculated based on the application of different rates to specified tiers of minutes. The highest rate is applied to an initial tier of minutes up to a defined maximum number, a

lower rate is applied to the next tier, again up to a second defined maximum number of minutes, and a lower rate is applied to any minutes in excess of the second maximum.

40. The FCC designed this tiered rate structure to "give small VRS providers a reasonable opportunity to improve the efficiency of their operations and to reach the optimum scale to compete effectively after the implementation of structural reforms." They suggest that "applying a tiered structure would best balance the need to maintain a multi-provider VRS market, reflect providers' differing cost structures, and provide compensation rate stability, while minimizing the cost burden on TRS Fund contributors."

41. The FCC also states that "the gap between the highest and lowest tiered rates should be reduced over time," with the ultimate expectation that "the tiered rate structure eventually would be replaced by a unitary compensation rate for all minutes, which would be set based on competitive bidding."

42. As the IP CTS market and VRS market share many common characteristics, it may be worthwhile to consider applying a similar tiered structure that compensates small suppliers at higher rates in the short run in IP CTS market.

VIII. APPENDIX

A. Suppliers' Equilibrium Marketing Strategies in the Illustrative Example

43. This Appendix explains the dynamics after a reverse auction and a tiered rate mechanism for setting IP CTS rate respectively in the illustrative example of section V. It will be shown that consolidation occurs as a Nash equilibrium under suppliers' marketing strategies after a reverse auction. On the other hand, using a tiered rate mechanism can promote competition and reduce industry-wide average cost in equilibrium.

44. Consider the two suppliers' subscribers and cost information in Table 1 again:

Table 1 – Subscribers and Costs of Supplier A and B in Year 1

Year 1	Subscribers	Fixed Cost	Variable Cost	Total Cost	Average Cost
Supplier A	1000	100	1	1100	1.10
Supplier B	200	100	0.8	260	1.30

45. Suppose a reverse auction is conducted to select the lower cost supplier in Year 1. It is a dominant strategy for each supplier to drop out at their true average cost at the time of auction. In the dominant strategy equilibrium, Supplier B will drop out at the price of 1.30. Supplier A will win the auction. The compensating rate will be set at 1.30. Supplier A's profit from serving its 1000 subscribers in Year 1 is 200. Supplier B's profit from serving its 200 subscribers in Year 1 is 0.

46. Suppose marketing activities cost 50 to both supplier A and B. Suppose the number of subscribers of supplier A and B in Year 2 under different marketing strategies in Year 1 is given in the matrix below:

Supplier B

	Marketing	No Marketing
Marketing	1200, 500	1500, 100
No Marketing	900, 700	1100, 300

Supplier A

47. The payoffs to supplier A and B in Year 2 under different marketing strategies in Year 1 are given in the matrix below[6]:

Supplier B

	Marketing	No Marketing
Marketing	210, -290	300, -50
No Marketing	170, -450	230, -80

Supplier A

[6] This payoff matrix is calculated based on the assumption that losing suppliers will not be compensated for adding new subscribers, as described in Dr. Skrzypacz's main auction design proposal. If an alternative treatment that allows losing suppliers to add new subscribers at a lower rate is used, the payoffs will be different, but both suppliers' equilibrium marketing strategies will be the same.

48. It is a dominant strategy for supplier A to invest in marketing after winning auction in Year 1. It is a dominant strategy for supplier B not to invest in marketing after losing auction in Year 1. Therefore, in the dominant strategy equilibrium, supplier A will invest in marketing and add 500 subscribers in Year 2. Supplier B will not invest in marketing and lose 100 subscribers in Year 2. This yields the two suppliers' subscribers and costs in Year 2 presented in Table 2:

Table 2 – Subscribers and Costs of Supplier A and B in Year 2 after Auction

Year 2	Subscribers	Fixed Cost	Variable Cost	Total Cost	Average Cost
Supplier A	1500	100	1	1600	1.07
Supplier B	100	100	0.8	180	1.80

49. Supplier A's average cost will be lower and supplier B's average cost will be higher due to the change in their scales in Year 2. If the compensating rate is kept at 1.30 in Year 2, then supplier B will be driven out of the market, as its average cost falls below the compensation rate after losing 100 subscribers.

50. If another reverse auction is conducted in Year 2, then supplier B will drop out at its new average cost in the auction. The compensation rate will be set at 1.80 in Year 2. Supplier A will earn a higher profit from serving its subscribers and will continue to invest in marketing in equilibrium. Supplier B will not invest in marketing in equilibrium as it will not be compensated for adding more subscribers. Supplier B will eventually lose all its subscribers and exit the market under the equilibrium marketing strategies. Therefore, no matter whether another reverse auction is conducted in Year 2, supplier B will be eventually driven out of the market in equilibrium.

51. Next, suppose a tiered rate mechanism that sets compensation rate for supplier A to be 1.20 and compensation rate for supplier B to be 1.40 is used in Year 1. Supplier A will earn a profit of 100 from serving its 1000 customers. Supplier B will earn a profit of 20 from serving its 200 customers.

52. The payoffs to supplier A and B under different marketing strategies are shown in the matrix below:

Supplier B

Supplier A	Marketing	No Marketing
Marketing	90, 150	150, 39
No Marketing	80, 270	120, 80

53. It is a dominant strategy for both suppliers to invest in marketing after a tiered rate mechanism is used in Year 1. Supplier A will add 200 subscribers and supplier B will add 300 subscribers in Year 2 in the unique dominant strategy equilibrium. This gives the suppliers' subscribers and cost information in Year 2 presented in Table 3:

Table 3 – Subscribers and Costs of Supplier A and B in Year 2 without Auction

Year 2	Subscribers	Fixed Cost	Variable Cost	Total Cost	Average Cost
Supplier A	1200	100	1	1300	1.08
Supplier B	500	100	0.8	500	1.00

54. No supplier will be driven out of the market in equilibrium. More consumers will receive the IP CTS service at a lower industry-wide average cost if a tiered-rate mechanism is used in Year 1.

B. Qualifications

55. David J. Salant is a Professor Associé at the Toulouse School of Economics, Senior Managing Director, FTI Consulting, Inc., Research Associate at Columbia CITI, and the author of *A Primer on Auction Design, Management and Strategy*," MIT Press 2014. He spent ten years in research and development at Bell and GTE (now Verizon) Labs. He has served as a designated bidder in a number of FCC spectrum auctions, including in Auction 58 for Alaska Native Broadband 1 and Alaska Native Broadband 2 (did not bid); Auction 66 for Denali Spectrum License, LLC; Auction 73 for Alltel; and Auction 1002 for Comcast. In addition, he served on-site leading the auction strategy and advising bidders in FCC Auctions 4 (PCS), 7 (Specialized Mobile Radio), 22 (PCS), 35 (PCS), 49 (Lower 700 MHz), 58 (PCS), 66 (AWS-1), 73 (700 MHz), 97 (AWS-3), and 1002 (Incentive Auction). His on-site advisory experience also includes spectrum auctions in Australia, Austria, Belgium, Brazil, Canada, India, Italy, Mexico, the Netherlands, Portugal, Singapore, Spain, the United Kingdom, and Switzerland. His auction design consulting experience includes advising the FCC on Combinatorial Bidding (with Vernon Smith), Industry Canada, the Mexico SCT, the Italian Ministry of Communications, the Singapore IDA, the Australia ACCC, and the Pakistan Ministry of Communications.

56. Additional information about his professional experience can be found in his curriculum vitae, attached below.

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- **PROFESSIONAL EXPERIENCE**

2008 – 2011, 2017-	Senior Managing Director, FTI Consulting
2007 –	Professor Associé/Invité and Associated Researcher Toulouse School of Economics
2006 –	Co-Founder, Auction Technologies, Inc.
2013 – 2015	Managing Director Alvarez and Marsal

2003 –	Adjunct Senior Research Scholar, Columbia Institute for Tele-Information, Columbia University
2004 –	Research Professor, Center for Research in Wireless Communications, Clemson University
2006 – 2008	Senior Consultant, CRA International
2003 – 2004	Co-CEO and Founder, Optimal Markets, Inc.
2000 – 2003	Senior Vice President, NERA
2000	Special Consultant, NERA
1999 – 2002	President and Founder, Alkera Inc d/b/a Optimal Auctions.
1999– 2000	Managing Director, Navigant Consulting Incorporated/LECG, Incorporated
1998–1999	Principal, LECG, Incorporated
1996–1998	Director, LECG, Incorporated
1995–1996	Principal, Charles River Associates Incorporated
1993–1995	Principal Member Technical Staff, GTE Laboratories Incorporated
1991–1993	Research Associate, Department of Economics, Boston University
1987–1993	Senior Member Technical Staff, GTE Laboratories Incorporated
1983–1987	Assistant Professor, Department of Economics, VPI
1979–1983	Assistant Professor, Department of Economics, SUNY at Buffalo

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Ph.D., (Economics) University of Rochester, February, 1981.

M.A., (Economics) University of Rochester, May, 1978.

A.B., (Economics and Mathematics) Washington University, Magna Cum Laude, May, 1975.

- **PUBLICATIONS**

Book

"A Primer on Auction Design, Management and Strategy," MIT Press (2014).

Refereed Publications

"Resale Price Maintenance Post Leegin: A Model of RPM Incentives, (with William Comanor), *Review of Industrial Organization* Vol. 50, No. 2 (March 2017): 169-79.

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"Toward the Best Bet." With Phillip McLeod, *Electric Perspectives,* Vol. 23, No. 5, (September-October 1998): 74-83.

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<u>Other Publications</u>

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"Multi-Lot Auctions: Applications to Regulatory Restructuring." In *Obtaining the Best from Regulation and Competition*, edited by M.A. Crew and S. Spiegel. Boston, MA: Kluwer Academic Publishers (2004).

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"Price Setting in Professional Team Sports." Chapter 5 in Paul M. Sommers (ed.), *Diamonds Are Forever: The Business of Baseball*. The Brookings Institution, 1992.

- **OTHER PAPERS**

"Auctions for Essential Inputs," with Patrick Rey, 2016.

"A multi-regional model of electric resource adequacy," (with Claude Crampes) TSE Working Papers 18-877,

"The Effects of Standard Setting Organization Policy on Investment and Welfare," with Paul Seabright, 2014.

"Auction Design for Capacity Markets," with Robert Stoddard, June, 2008.

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- **PATENTS**

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"Method and System for Computer-Based Auctioning of Basic Generation Services," US Patent No. 8,285,601 October 9, 2012.

- **EDITORIAL AND REFEREE ACTIVITY**

Dr. Salant is the guest editor of two special issues of the *Journal of Regulatory Economics* on Auctions and Regulation. In addition, Dr. Salant has served as a referee for *American Economic Review, Canadian Journal of Economics, Contemporary Policy Issues. Econometrica, Economic Inquiry, The Economic Journal, Games and Economic Behavior, IEEE/ACM Transactions on Networking, International Economic Review, Journal of Political Economy, Journal of Economics and Management Strategy, Journal of Regulatory Economics, Journal of Macroeconomics,* National Science Foundation, and the *RAND Journal of Economics*

- **CONFERENCES**

Organized Conferences on

"Spectrum Auction Design, Experience and Post-Auction Market Structure," Columbia University, CITI, June 2014.

"Smart Radio," Center for Tele Information, Columbia University, joint with Clemson Center for Research in Wireless Communications and Virginia Tech's College of Engineering, http://www4.gsb.columbia.edu/citi/events/eventsarchive/smartradio.

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"After the Closing of the Spectrum Frontier: What Spectrum Models Work Best and When," Center for Tele Information, Columbia University, 2004, http://www4.gsb.columbia.edu/citi/events/eventsarchive/spectrumfrontier.

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Phi Beta Kappa, 1975
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Auction Theory and Practice (graduate)
Microeconomics (graduate and undergraduate)
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Game Theory
Public Finance (graduate and undergraduate)
Economics of Sports
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- **CONSULTING EXPERIENCE**

TESTIMONY

At Montana Public Service Commission on behalf of Northwestern Energy on default service procurement auction (2006).

At Illinois Commerce Commission on default service procurement auctions, Docket Numbers 05-0159, 05-0160, 05-0161 and 05-0162, (Spring and Summer 2005).

At Public Utility Commission of Texas, on capacity entitlements auctions, Project Number 24492 (2001).

At New Jersey Board of Public Utilities, on auction design for Basic Generation Services, Docket Number EX 01110754 (2000).

Hearing of the International Competition Policy Advisory Committee on 3G standard setting procedures and competition policy, June 1999.

On behalf of the FCC in Nextwave Personal Communications Inc v. Federal Communications Commission, May, 1999

On behalf of PanCanadian at Alberta Energy Utilities Board (January, 1996) on pipeline cost allocation principles.

TELECOMMUNICATIONS:

- Spectrum Auction Bidder Support (mostly lead adviser)

(2018) CAF-2 US (confidential)

(2016 -) KPN (Netherlands)

(2017 -) Sunrise (Switzerland)*

(2015 - 17) US Incentive Auctions *

(2015) German multi-band, Canada AWS

(2014) Canada 700 MHz, US AWS (#97)*, Poland

(2013) Austria (multi-band)*, Canada, Slovakia, US

(2012) Netherlands&*, Belgium, Swiss 4G, France 4G auctions

(2011) Spain 4G, Italy 4G*, Portugal 4G, Belgium 4G, Greece 4G

(2010) German 4G*, Mexican AWS/PCS*, Indian 3G*, Mexico 3G

(2008) US 700 (#73), Canadian AWS, Italian WiMax

(2006) US AWS -1 (#66) *

(2005) US PCS (#58) *

(2003) US 700 (#49)

(2002) Taiwan 3G

(2001) US PCS (#35)*, Australian 3G*, Austrian 3G, Danish 3G, Dutch 3G

(2000) US 39 GHz (#30), Australian PCS*, UK 3G*, German 3G*

(1999) US PCS (#22)*, Canadian 24 and 38 GHz*

(1998) Dutch 2G, Telebras privatization, Mexico PCS

(1997) Brazil B block cellular

(1996) US PCS (#5), US MDS (#6), US SMR (#7)

(1994-5) US PCS (#4)*

- Regulation and Wireless

  Development of wireless industry simulation modeling team at Math Science Research Center at Bell Labs (2000–2001).

  Advised Leap Wireless on the ATT and T-Mobile proposed merger (2010).

Advised E-Plus on wholesale roaming regulation (2009 – 2010).

Advised QUALCOMM on European 3G standard setting, including numerous filings and testimony (1999 – 2001)

Advised QUALCOMM on competition policy issues related to European competition policy matters (2005 – 2007)

Led team in developing GTE's Universal Service auction proposal (1995–6)

Project leader for wireless cost simulation model for GTE Labs (1989 – 93)

Advised Leap Wireless on wholesale roaming, prepared testimony (2005)

Advised SouthernLinc Wireless on wholesale roaming (2005)

Advising Canadian operator on wholesale roaming (2009)

Advised Indian operator on spectrum requirements for 3G (2008)

Advised Peru's OSIPTEL on rural service procurement auctions (1995)

- Spectrum Allocation and Auction Design

Advised Pakistan PTA on 3G auction (2013–4)

Advised Hungarian NMHH on auction design options (2012)

Advised satellite television operator on design of auction for television ads (2011)

Advised Telecommunications Regulatory Authority of India (2004).

Advised Industry Canada on 2300 MHz/3500 MHz auction (2003–4)

Advised UK Radiocommunications Agency on spectrum trading (2002)

Advised Netherlands DGTP on design of auction for sale of AM and FM frequency rights (2001–2)

Advised Italian Ministry of Communication in design of 3G spectrum auction (2000)

Advised on design of auction for ads in telephone directories (1999)

Advised Industry Canada on spectrum auctions for LMCS frequencies (1996) and 24/38 GHz frequencies (1999)

Designed and implemented first spectrum auction for paging licenses for the Mexican Ministry of Communications (SCT), November 1996

Designed and implemented first spectrum auction for trunk radio frequencies for the Guatemalan Superintendent of Telecommunications, May 1997

FCC experimental testing of combinatorial auction mechanisms (2000)

Advised IDA Singapore on 3G auctions (2001)
Advised IDA Singapore on wireless local loop auctions (2001)

Advised Australian ACA on 3G auctions (2000)

Advised Australian SMA on design of 500 MHz license spectrum auction (1996)

Led team that developed auction software adopted by Industry Canada (1995), the Mexican Ministry of Communications and Transport (1995) and the Guatemalan Superintendent of Telecommunications (1996 – 7).

Advised Colombia (Ministry of Communications) in draft auction legislation for spectrum auctions (1999).

Advised Peru (OSIPTEL) on spectrum allocations for universal service (1995).

ENERGY AND CHEMICALS:

Carbon credits auction design – North America (2016)

Advised on Energy Procurement, Southern California Edison (2009 – 10)

Advised First Energy Solutions on Bidding Strategy (2009)

Advised California Forward Capacity Markets Association on California Capacity Markets (2007).

Served as Auction Manager for Northwestern Energy default service procurement auction (2006). Testified at Montana Public Service Commission.

Advised NYSERDA on auction design and bidding procedures for NYSERDA Renewable Electricity Credit Procurement (2006).

Served as Auction Monitor for Illinois Commerce Commission (2005 - 6). Testified at Illinois Commerce Commission (2006).

Developed design and implementation plan for Empire Connection transmission rights auction (2003)

Developed and managed auction for Williams for selling ethylene (2003)

Developed auction design adopted by OMV for natural gas release program (2003)

Advised Acquirente Unico (Italy) on default service options (2002–3)

Advised Texas Utilities on energy entitlement auctions, and testified at PUCT (2001–2)

Developed Standard Offer Service procurement auction design for New Jersey Utilities (2000–2).

Advised Netherlands DTe on transmission rights auctions (2000)

Advised EPCOR on bidding strategy in Alberta PPA auction (2000)

Advised EPCOR on bidding strategy in Alberta Balancing Pool auction (2000)

Advised on bidding 3rd round PEDEVESA auction of oil lease rights in Venezuela (1996)