

Smart Grid Insights: AMI

The Smart Grid ecosystem is a globe-spanning network of thousands of companies. Emerging from under the Smart Grid radar is AMI (advanced metering infrastructure), which includes among other moving parts, communications networks and database systems that aim to rejuvenate the United States power grid.

This AMI report by Zpryme:

- Defines and illustrates the **future trajectory of AMI**
- **Assesses the AMI marketplace** from 2010 to 2015
- **Recommends an early-stage strategy** to enter the Smart Grid and AMI marketplace
- Lastly, probes the current state of AMI with an **exclusive Q&A with Tantalus Systems Corp.**

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Tantalus

September 2010

OVER THE MOUNTAINS. THROUGH THE WOODS.

> Tantalus shines in terrain that cripples other Smart Grid technology.

Dear Executives,

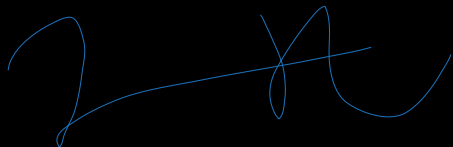
It seems most recently that the U.S. nationwide effort to upgrade the power grid is increasingly being performed by a more diverse collection of companies. From Grid Net teaming up with Sprint to provide a 4G network solution that connects smart meters and Smart Grid routers to GE collaborating with Nissan in introducing Smart Grid-compatible electric vehicle chargers. In the process of these developments there has been an added push for AMI (advanced metering infrastructure).

For consumers, AMI means greater control; however is AMI the obvious winner when a business is zeroing in on the Smart Grid market? In this issue Tammy Zucco of Tantalus Systems Corp. goes on to explain that the market action is not in AMI per se, but in Smart Grid communications.

That said, the success of AMI deployment depends on how well components communicate with each other and if AMI solutions can sufficiently meet latency and bandwidth requirements to support distribution automation initiatives. At Zpryme, we know that is easier said than done. Thus many questions remain and with increased competition from companies such as SmartSynch, Trilliant, and Tropos Networks, 2010 is turning out to be the year that AMI gets a taste of reality. Regardless of what final shape and form the U.S. Smart Grid rollout might take, companies should still be prepared for large scale development of AMI in the near term.

Zpryme welcomes your thoughts and suggestions for upcoming features. Please feel free to contact us about this month's issue via email at smart.grid@zpryme.com.

Kind Regards,



Jason S. Rodriguez
CEO & Director of Research
Zpryme Research & Consulting, LLC

“Regardless of what final shape and form the U.S. Smart Grid rollout might take, [companies should still be prepared] for large scale development of AMI in the near term.”




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Defining Advanced Metering Infrastructure

As defined by the Electric Power Research Institute (EPRI)

According to EPRI, AMI or Advanced Metering Infrastructure typically refers to the full measurement and collection system that includes meters at the customer site, communication networks between the customer and a service provider, such as an electric, gas, or water utility, and data reception and management systems that make the information available to the service provider. Advanced metering systems are comprised of state-of-the-art electronic/digital hardware and software, which combine interval data measurement with continuously available remote communications. These systems enable measurement of detailed, time-based information and frequent collection and transmittal of such information to various parties. The customer is equipped with advanced solid state, electronic meters that collect time-based data. Meters include all three types—electricity, gas, and water meters. These meters have the ability to transmit the collected data through commonly available fixed networks such as Broadband over Power Line (BPL), Power Line Communications (PLC), Fixed Radio Frequency (RF) networks, and public networks (e.g., landline, cellular, paging). The meter data are received by the AMI host system and sent to the Meter Data Management System (MDMS) that manages data storage and analysis to provide the information in useful form to the utility. AMI enables two-way communications, so communication from the utility to the meter could also take place.

What's the Trajectory of the AMI Market?

Advanced Metering Infrastructure (AMI) is a crucial and fundamental first milestone in the development and deployment of the Smart Grid. In fact, 23.9% (\$818 million) of the \$3.4 billion in U.S. Smart Grid stimulus funds awarded in 2009 were for 31 AMI projects. Without successful AMI implementation across utilities in the U.S., support for further investments in the Smart Grid will face strong opposition from consumers, shareholders, and public service commissions. For example, the consumer backlash going on at Xcel Energy in Colorado or Pacific Gas and Electric in California is a testament to the difficulties that can arise when initial AMI deployments do not go according to plan.

As the U.S. AMI market value approaches \$2.54 billion in 2010, the core focus of AMI remains on smart electric, water, and gas meters. However, smart meters (electric, water, and gas) only account for 46.8% of the total AMI market value in 2010. By 2015, this figure is projected to reach 39.0%. This focus on smart meters creates an emerging opportunity for AMI communication systems, Meter Data Management Systems (MDMS), customer data management, and AMI program management. Currently, companies such as GridPoint, eMeter, Tantalus, Itron, Google, Silver Spring Networks, Cisco, and IBM are collectively trying to capture these AMI market opportunities, however the AMI growth trajectory reveals that major service and technology gaps still need to be filled for the AMI market of future as the U.S. market is projected to reach \$5.82 billion in 2015.

AMI U.S. Market Value



Source: Zpryme

Moving Confidently into the Smart Grid Market Space

Certainly, the current Smart Grid integrators will launch new services in the future, but the more interesting question is: “Which new company (start-up, clean-tech titan, industry conglomerate or industry blue-chip, etc.) will put their stamp on the Smart Grid AMI market space?” Will the company come from the software, telecom, utility, social media, manufacturing, automotive, IT, advertising, or even the retail industry? The answer to this question remains to be seen, but one thing is for sure, new companies from a wide array of industries will continue to tap into the emerging opportunities in the Smart Grid market.

Although the idea of capturing a significant piece of the AMI market may appear vastly lucrative, companies should proceed with caution before pursuing new business opportunities in this sector. That being said, Zpryme has laid out a simple framework for potential new entrants to consider when deciding to launch new products and/or services for the Smart Grid market.

[Inadequate evaluation at phases (1) and (2) by a company could lead to a poor and costly decision to move forward; when in fact the most opportune decision could be to mitigate risk by not entering the market or delay entry into the market]

[A company should also be sure to consider the financial resources they have access to (e.g. government subsidies), existing customer base, relationships with utilities and key Smart Grid integrators]

[Product testing and identifying partners (phase 4) at the early stages of the game will mitigate the risks and liabilities by both major players and start-ups (e.g. ABB invests substantially in Smart Grid R&D; as does OPOWER which focuses on consumer behavior research and product testing and development)

1
Evaluate existing market opportunities
(e.g. primary & secondary research)

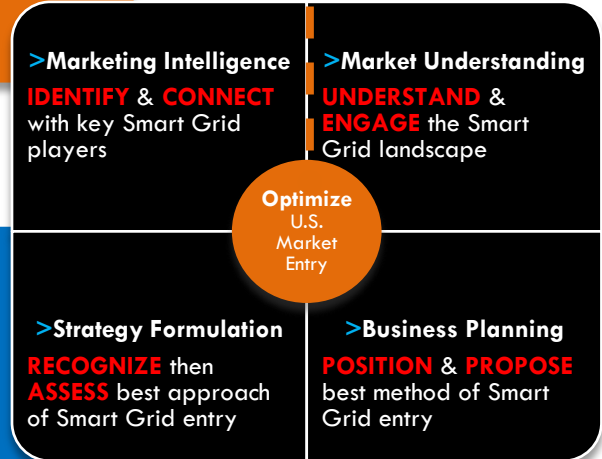
2
Evaluate internal company strengths
(e.g. R&D, labor, technology, & manufacturing advantages)

3
Begin R&D & product/service testing

6
Execute marketing & sales strategy

5
Begin strategy & product/service launch planning

4
Secure Smart Grid ecosystem business partners
(e.g. identify areas to participate in Smart Grid pilots and programs)



[It's in the best interest of a company in phases (4) and (5) to identify areas to participate in Smart Grid pilots and AMI programs in preparation for product/service launch (e.g. ComEd, GM, EPRI and City of Chicago are collaborating in the "ComEd Smart Grid Innovation Corridor" initiative)

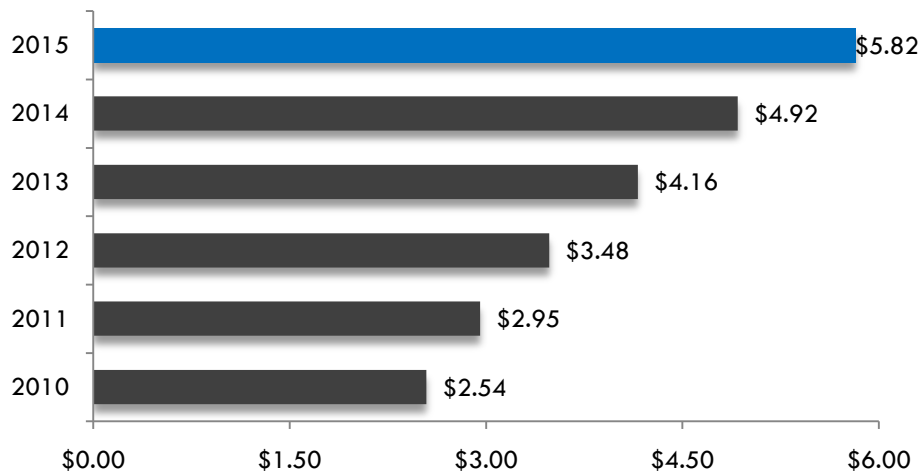
AMI: U.S. Market Value Forecast

Zpryme projects the U.S. AMI market will grow from \$2.54 billion in 2010 to \$5.82 billion in 2015, representing an 18.0% CAGR during this time period. Collective smart meter revenues (electric, gas, and water) are projected to grow from \$1.2 billion to \$2.3 billion during this time period.

Smart Meters

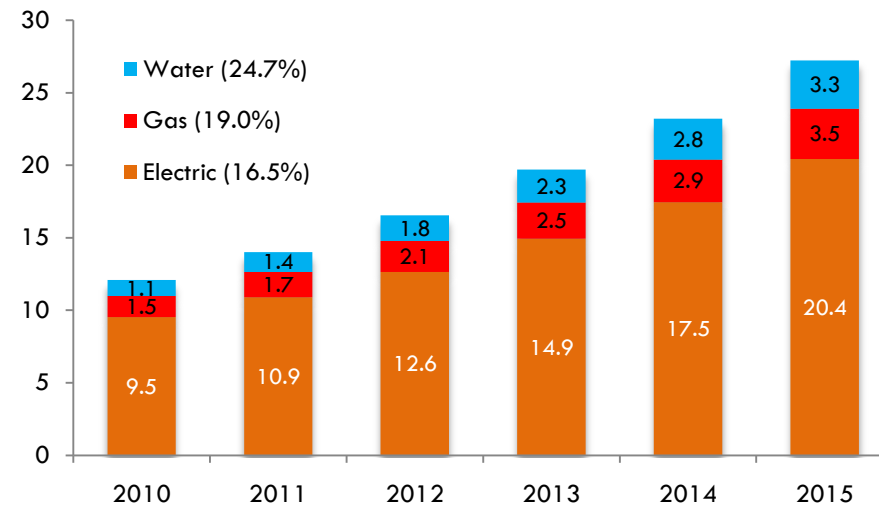
- Annual shipments of smart electric meters will grow from 9.5 million in 2010 to 20.4 million in 2015. The installed base of smart electric meters will grow from 15.9 million in 2010 to 63.4 million in 2015
- Annual shipments of smart gas meters will grow from 1.5 million in 2010 to 3.5 million in 2015. The installed base of smart gas meters will grow from 4.3 million in 2010 to 12.4 million in 2015
- Annual shipments of smart water meters will grow from 1.1 million in 2010 to 3.3 million in 2015. The installed base of smart water meters will grow from 2.9 million in 2010 to 9.9 million in 2015

Projected U.S. Advanced Metering Infrastructure Market
2010 - 2015 | in US billions
CAGR = 18.0%



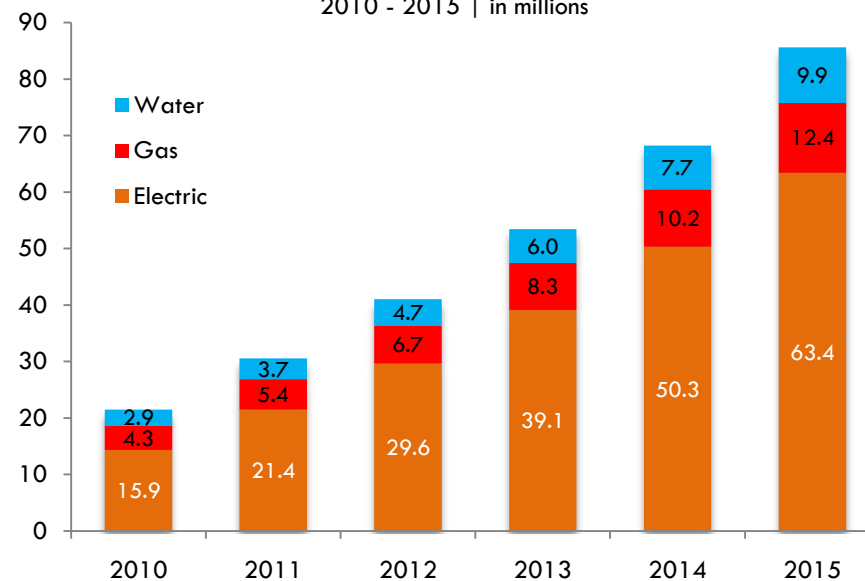
Source: Zpryme

Projected U.S. Annual Shipments of Smart Water, Gas, and Electric Meters
2010 - 2015 | in millions
(CAGR in parentheses)



Source: Zpryme

Projected U.S. Installed Base of Smart Water, Gas, and Electric Meters
2010 - 2015 | in millions

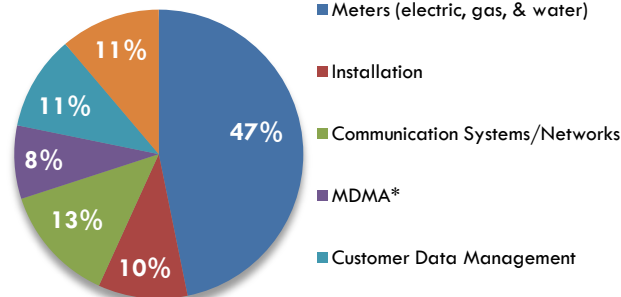


Source: Zpryme

AMI: U.S. Installation, Communications Systems, MDMA, Customer & Program Management Forecast

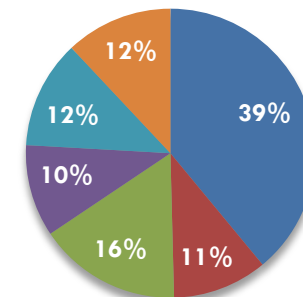
- Installation revenues are projected to grow from \$253.7 million in 2010 to \$616.5 million in 2015
- Communication system and network revenues are projected to grow from \$334.8 million in 2010 to \$934.1 million in 2015
- MDMA revenues are projected to grow from \$209.0 million in 2010 to \$597.5 million in 2015
- Customer data management revenues are projected to grow from \$270.8 million in 2010 to \$707.4 million in 2015
- Program management revenues are projected to grow from \$284.4 million in 2010 to \$696.5 million in 2015

Market Distribution by AMI Segment (2010)



Source: Zpryme

Market Distribution by AMI Segment (2015)



Source: Zpryme

Market Metric (in U.S. millions)	2010	2011	2012	2013	2014	2015	CAGR
Market Value by Segment							
Smart Electric Meters	\$999.6	\$1,110.2	\$1,249.2	\$1,429.8	\$1,622.7	\$1,841.6	13.0%
Smart Gas Meters	\$119.1	\$138.6	\$164.0	\$187.7	\$213.0	\$243.9	15.4%
Smart Water Meters	\$72.0	\$86.5	\$108.3	\$134.5	\$161.7	\$186.7	21.0%
Installation	\$253.7	\$302.3	\$359.9	\$433.7	\$517.7	\$616.5	19.4%
Communication Systems/Networks	\$334.8	\$404.5	\$496.5	\$617.3	\$760.2	\$934.1	22.8%
MDMA*	\$209.0	\$253.7	\$312.1	\$389.9	\$482.8	\$597.5	23.4%
Customer Data Management	\$270.8	\$323.5	\$392.4	\$480.9	\$583.7	\$707.4	21.2%
Program Management	\$284.4	\$335.0	\$400.3	\$484.7	\$581.4	\$696.5	19.6%
Total AMI Market Value	\$2,543.4	\$2,954.3	\$3,482.7	\$4,158.5	\$4,923.3	\$5,824.1	18.0%
Market Distribution by Segment							
Meters (Electric, Gas, and Water)	46.8%	45.2%	43.7%	42.1%	40.6%	39.0%	-----
Installation	10.0%	10.2%	10.3%	10.4%	10.5%	10.6%	-----
Communication Systems/Networks	13.2%	13.7%	14.3%	14.8%	15.4%	16.0%	-----
MDMA*	8.2%	8.6%	9.0%	9.4%	9.8%	10.3%	-----
Customer Data Management	10.6%	11.0%	11.3%	11.6%	11.9%	12.1%	-----
Program Management	11.2%	11.3%	11.5%	11.7%	11.8%	12.0%	-----
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	-----

*Meter Data Management Agent

Source: Zpryme

Q&A with Tantalus Systems Corp.



tammy
ZUCCO

Chief Marketing Officer
Tantalus Systems Corp.

Tammy Zucco, Chief Marketing Officer at Tantalus Systems Corp took the time to respond to questions posed from Zpryme on how the Vancouver-based company is stepping full stride into the AMI marketplace.

1. ZP: With more than 8% of all the meters in the world using automated meter technology what type of new technologies is Tantalus getting involved in to differentiate itself?

TZ: Tantalus is a Smart Grid communications technology provider, not just an AMI vendor. Of course, in North America AMI is the first application most utilities deploy. We provide comprehensive Smart Grid enabling technology for the small power segment AND a unique set of coverage and capacity capabilities for large power utilities. Our comprehensive portfolio for small power allows utilities to implement a future-proof communication network that allows it to evolve beyond AMI to Demand Response, Load Control, Distribution Automation, and Distributed Generation or Storage when the time is right. Our coverage capabilities are the best in the industry as proven by our FCC link-budget filings as well as our field proven installations in challenging terrains such as Alaska and the Appalachian Mountains. Unlike meter batch-oriented collection systems, TUNet is two-way command and control “push” technology. It was truly designed with real-time, self-healing capability that is not completely possible with polling technologies. Furthermore, it provides instant, field initiated event notifications such as outage alerts or load shed success without congesting the network.

2. ZP: What should consumers expect in 2011 from Tantalus and AMI?

TZ: We are at work right now developing new features for our existing communications platform that will allow utilities to capture additional

benefits of advanced demand interval readings, real-time pricing, outage management, advanced load control, switching and regulation. We are investing heavily in making sure our systems and products adhere to the NIST as well as other high level security compliance standards. Tantalus is working with several key partners in the industry such as GE, Itron, Badger, and Alcatel-Lucent to ensure that we have comprehensive offerings for our customers. In addition, we are forging new partnerships with niche suppliers where we can bring additional “best-in-class” value where we may not be the expert.

“I don’t think the game is AMI; at least not for Tantalus. It is Smart Grid communications - initially enabling basic AMI and gradually enabling advanced applications.”

3. ZP: With a proven history of success, including the recent Morristown Utility Systems adding Tantalus’ Smart Grid functionality to an existing Fiber-to-the-Home (FTTH) network, how does ‘experience’ play a role in the smart meter space?

TZ: Tantalus has more than 30 customers with field proven deployments, some of which have been using our technology for over six years and have already moved onto next generation functionality, such as load control.

We now count six customers which have transformed their Triple-Play FTTH networks into Homerun Networks, which allows them to gain additional value from a municipally owned broadband by also using it for Smart Grid communications. A few others use fiber-to-the-substation. Broadband provides an extremely robust backbone network. First of all, it’s a private network which means the utility maintains control and has cost predictability. It also offers the capacity, speed, and low latency needed for data intensive Smart Grid applications. Even if a municipality is years away from deploying FTTH, we designed TUNet so that a utility can easily migrate from one communications network to another with minimal cost or effort, or use a

combination of wireless and wired options simultaneously on a single technology platform.

We are an expert at rural coverage and connectivity, which is proven by our deployments in some of the nation's most challenging territories. As our competition has mostly focused on large deployments in fairly dense environments, we expect there to be great challenges in connectivity for polling and batch oriented technologies as they expand into rural areas with less density. It's connecting the last 20% that often proves to be the most difficult and costly. TUNet is a near-military-grade command and control system that has this competency built-in already. While most current utility deployments focus exclusively on AMI which is the easiest connectivity challenge they will have, we expect our experience and forethought in the architecture of our system will become even more relevant and obvious as Smart Grid applications expand.

4. ZP: What should the Smart Grid ecosystem expect for next-gen AMI?

TZ: I don't think the game is AMI; at least not for Tantalus. It is Smart Grid communications - initially enabling basic AMI and gradually enabling advanced applications such as Demand Response, Conservation, DA, DG, and EV at the pace that drives value for the utility. Time of use rates - which is a big deal for our customers in the TVA area as well as Canada - is also driving next generation features for AMI and Smart Grid communications systems in general. In terms of the SG landscape, I think continued collaboration among small and large players is a must and consolidation among AMI providers will happen.



Tantalus

Who We Are

Tantalus develops, manufactures and markets two-way data communications networks for electric, water and gas utilities.

The Tantalus Utility Network - TUNet® - is Smart Grid technology that enables a utility to monitor, control and respond to events anywhere and at any time across its distribution network. It serves as the communications backbone that makes Smart Metering, Power Quality Monitoring, Outage Reporting, Load Control, and Distribution Automation practical and cost effective. The result is more efficient operations, more accurate billing, and the ability for a utility to deliver a high level of customer service.

Tantalus is a private company founded in 1989. TUNet was launched in 2004. The production version represents over 250 staff years of development and earned several high-profile business & technology awards. TUNet systems are deployed throughout North America at utilities determined to gain more value from their network, manage energy resources wisely, and provide customers with a high level of service.

Learn more @ www.tantalus.com

Smart Grid Cloud (recent U.S. developments)

\$14.5

(million) the amount that Duke Energy agreed to pay for Echelon Corp's Linux-based software environment for Smart Grid applications and new hardware.

Washington: Cogenera Corporation has opened a US office for its "Managed Services" billing and customer care solution to the municipal utilities and coops.

Colorado: Power Tagging will partner with Lockheed Martin to develop enhanced distribution management and Smart Grid command and control systems. Also, Toyota partnered with University of Colorado in a field study of household experiences and the technical impacts of plug-in hybrid electric vehicles (PHVs) in a "Smart Grid."

Ohio: Exacter, Inc announced unique ability to locate problems on the overhead distribution network that are creating signal noise.

Illinois: ComEd, a unit of Chicago-based Exelon Corporation has announced the setting up of ComEd Smart Grid Innovation Corridor, a large throng of Smart Grid pilots (partial funding of \$5 million by the US DOE grant).

Maryland: Energetics Inc. announced signing a \$21.7 million three-year contract with the U.S. DOE.

California: Grid2Home announced that it has obtained a round of seed funding from Granite Ventures. Also, Sprint Nextel has collaborated with Grid Net to connect smart meters and Smart Grid routers using its 4G network.

Georgia: Cobb EMC, has selected Sensus to deliver Smart Grid solutions to its nearly 200,000 members.

North Carolina: Duke Energy Corp. has selected Echelon Corp. and Ambient Corp. to further develop its grid-based communications to connect digital meters, power-line sensors and automated power-switching equipment. Also, PowerSecure announced \$15 million of new contracts for its Smart Grid IDG Power Systems.

Texas: Austin Energy has selected Autodesk Utility Design Software to optimize facility and network design.

Florida: As part of an \$8.5 million investment by Sandia National Laboratories, Florida Solar Energy Center at the University of Central Florida will develop a demonstration that will feature a suite of new functionalities such as Smart Grid power controls, continued operation in the events of voltage and frequency disturbances, and improved safety of PV systems.

\$38.9

(million) the amount that Constellation Energy has agreed to pay to acquire CPower.

\$15.0

(million) the amount of series C funding that Coulomb Technologies received to fuel growth of its ChargePoint Network for charging EVs (and future V2G technology).

There is **only one** Zpryme.

The Smart Grid has moved beyond niche status and is quickly becoming integral to an organization's global investment strategy. Zpryme is focused on helping our clients better understand and engage the Smart Grid ecosystem — via [easy-to-digest] [actionable] market insights and advisory.

Intelligent research for an **intelligent market.**

