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ADIPEC ROUNDTABLE INSIGHTS REPORT 2026

MAKE IT IN THE EMIRATES: GRAPHENE FROM GAS?



How to Build a Resilient Advanced Materials Value Chain

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FOREWORD

From Gas to Graphene: Building a New Industrial Value Chain

Matthew Nix
Head of Corporate Finance, Dana Gas

Natural gas has a role to play in building the Gulf's advanced materials industry. At Dana Gas, our partnership with Levidian began with exploring ways to reduce emissions from gas production. That exploration revealed a wider commercial opportunity: producing materials close to the industries that could use them.

Today, graphene is being produced in Sharjah. This moves the conversation beyond potential and gives customers the opportunity to examine locally manufactured material and assess its suitability for their applications.

Our approach brings together existing assets, access to gas and power, and proximity to customers across the UAE and wider GCC. It reflects our view that graphene production should be developed as a manufacturing business, with customer demand guiding its growth.

The next step is to translate that production capability into commercial adoption. The roundtable highlighted opportunities across industrial applications, alongside the importance of demonstrating performance, ensuring consistency and understanding customers' practical requirements.



We see significant potential, while recognizing that the pace and shape of market development are still emerging. Building this value chain will require technical expertise, commercial focus and close cooperation with industrial users. For Dana Gas, it represents an opportunity to create greater value from natural gas through manufacturing. ■

Graphene's Next Chapter Depends on Customer Confidence

Alex Holden
CEO, Levidian

Graphene's commercial future depends on giving industrial customers confidence that it can improve their products and be supplied reliably at a price they can justify.

For years, businesses achieved promising laboratory results but struggled to obtain larger quantities or reproduce the same performance with another batch. That experience created skepticism. Overcoming it requires consistent material, dependable production and a credible pathway to scale.

Producing graphene locally changes that conversation. Customers can visit Sharjah, see the system operating and take material into their laboratories and industrial processes. Demonstrating capability builds confidence in a way that promises alone cannot.

The next step is choosing applications carefully. Economic viability and market readiness vary considerably. Thermal management, drilling fluids and protective coatings offer different opportunities from cement and concrete, where potential volumes are substantial but cost pressures are particularly demanding.

Our discussions with customers increasingly focus on competitiveness. A material that allows equipment to operate longer, at higher temperatures or with better performance has



a commercial proposition. Where that also reduces emissions, the benefits reinforce each other.

We must make adoption easier too. Customers need support in integrating graphene into products and processes, rather than being left to solve every technical challenge themselves.

This remains a market under development. Reliable supply, viable pricing and partners capable of supporting expansion are essential to moving customers from experimentation into purchasing commitments.

The UAE offers an environment willing to test new ideas and persist with them. Turning that willingness into industrial adoption is the opportunity before us. ■

GRAPHENE FROM GAS: TURNING LOCAL PRODUCTION INTO INDUSTRIAL VALUE

Building a resilient advanced materials value chain begins with a practical question: what problem will the material solve for the customer? Producing graphene from natural gas in the UAE creates an industrial opportunity, but production alone cannot establish a market. The next step is to connect reliable local supply with demonstrated performance, competitive economics and customers prepared to move from trials to procurement.



That was the central challenge explored at the Dana Gas and Levidian roundtable. Their partnership began with examining ways to reduce emissions from gas production. It evolved into a manufacturing proposition, recognizing that the carbon produced through methane cracking could have commercial value in its own right. Locating production near potential customers became as important as locating it near gas resources.

Sharjah provides a foundation for that approach. Matthew Nix described how existing land, access to natural gas and power, and connections to customers across the UAE and wider GCC supported the decision to establish production there. Graphene is already being produced, allowing prospective users to assess actual material rather than rely entirely on presentations about future capability.

For industrial buyers, that distinction matters. Participants described earlier frustrations with graphene, including difficulty obtaining sufficient quantities and reproducing results between batches. A resilient supply chain must therefore offer consistency alongside capacity. Customers need confidence that material tested successfully today can be supplied with the same characteristics when they commit it to an industrial process.

This makes repeatability a commercial requirement. Levidian's representatives explained that controlled production parameters support consistent material, while technical teams help identify where that material performs well. Graphene should be assessed against specific applications and grades. Treating it as a universal solution risks recreating the disappointment that has previously slowed adoption.

The commercial route also differs between sectors. Construction offers substantial potential volumes, but cement and concrete operate under demanding cost constraints. Other applications, including protective coatings, drilling fluids, lubricants and thermal management, may support different price points where performance improvements justify the additional cost. Market development should follow those differences rather than assume that the largest potential market will become the first major customer.

The buyer perspective brought this into focus. The steel and cement discussion highlighted interest in local production alongside the need for competitive costs and greater scale. It also showed that the immediate customer may sit further downstream, among ready-mix producers, coating formulators or other processors. Producers must identify who actually incorporates the material and who captures the benefit.

Making adoption easier is equally important. Many potential customers lack the research resources to develop formulations from graphene powder themselves. Supplying dispersions and intermediary products can reduce that burden. The roundtable described a progression toward forms customers can handle more readily, supported by guidance on testing, dispersion and integration into existing operations.

That support must extend beyond the laboratory. Successful trials need a credible route into production, including an understanding of handling requirements and any engineering changes. Technical collaboration should establish how the additive affects the finished product, what modifications are necessary and whether the resulting benefit is commercially meaningful. The objective is a workable industrial process with evidence behind it.

Specifications present another barrier, particularly in construction. A promising additive may struggle to gain traction if project requirements do not recognize its application. Participants discussed working with government entities and involving regulators through trials and scale-up. Demonstration projects can help build the evidence and familiarity needed for specifications to evolve alongside the technology.

Investment must then follow customer commitment. Dana Gas has invested in initial production at the Sharjah Graphene Park to demonstrate capability and support customer trials ahead of long-term offtake agreements. Matthew explained that later phases will be scaled in step with long-term offtake agreements. This provides a practical sequence: establish supply, validate applications, secure purchasing commitments and expand capacity against credible demand.

The underlying economics must remain robust. Matthew identified gas and electricity as key inputs, with options including solar power being evaluated. He noted that the project is assessed on graphene, with hydrogen as potential upside. Possible use of flare gas and other underutilised gas streams remains another avenue for exploration.

The wider opportunity is to retain more value from the region's resources through manufacturing, technical capability and locally developed applications. Make it in the Emirates gains substance when industrial users can obtain dependable material, demonstrate benefits and build competitive products around it.

A resilient graphene value chain will therefore require connected decisions across production, customer development, technical support, specifications and finance. Local supply creates the starting point; consistent performance and viable applications create demand. Customer confidence must be earned throughout that entire process. The priority is to turn promising trials into repeat orders, with capacity growing alongside customers. That is how graphene from gas can become a durable industrial business and contribute to the Gulf's advanced materials ambitions. ■





From Graphene Production to Practical Industrial Adoption

1. BUILDING CONFIDENCE IN GRAPHENE'S PERFORMANCE

Dr. Morgan Eldred, Founder, Digital Energy: *How do you build customer confidence when previous graphene trials have not always delivered successful or repeatable results?*

Dr. Arun Prakash Aranga Raju, Principal Scientist, Levidian:

We focus on applications where we understand the material's capabilities and have evidence to support its performance. Consistency is important because customers have previously achieved promising results but struggled to reproduce them. Our role includes helping customers test the material correctly, understand its value and identify where it can deliver improvements.

2. SUPPORTING CUSTOMERS WITH LIMITED RESEARCH CAPABILITIES

Morgan: *How can smaller industrial customers adopt graphene without extensive laboratory resources?*

Dr. Arun: Supplying graphene powder alone is not always sufficient. We also develop dispersions that customers can incorporate more easily into their products. Paint manufacturers and thermal management businesses, for example, may prefer a liquid formulation. Combining suitable product formats with testing and application guidance helps reduce the technical burden of adoption.

3. INTEGRATING GRAPHENE INTO EXISTING FACILITIES

Morgan: *Do customers need to retrofit their facilities?*

Dr. Arun: We work with engineering teams to understand existing facilities and material flows, aiming to minimize disruption. Some customers already handle carbon powders and want to develop their own formulations while protecting their intellectual property. Others need an



intermediary product, such as a dispersion. The approach depends on their capabilities and operating requirements.

4. MANAGING STORAGE AND HANDLING REQUIREMENTS

Morgan: *Would graphene change customers' storage and handling processes?*

Dr. Arun: We provide guidance on handling and formulation. The amount of graphene needed in a finished product can be small, which influences storage requirements. Dispersions provide another way to supply and handle the material. We are working through these requirements with customers, and some applications will require engineering modifications.

5. IMPROVING COATINGS RATHER THAN CHANGING STEEL GRADES

Morgan: *Could graphene make lower-grade oilfield pipe perform like a higher-grade alternative?*

Dr. Arun: We are not claiming that graphene changes the underlying steel grade. The opportunity is to improve the external protective coating. When graphene is well dispersed in an epoxy coating, it can strengthen the barrier against substances penetrating toward the steel. The longer penetration path helps improve protection against corrosion. ■

Top 9 Insights

Turning Methane into Valuable Materials & Hydrogen

Dr. Abdalla Alghfeli, CEO and Co-Founder, StarVolta

1. COMMERCIALIZATION REQUIRES CONTINUOUS OPERATION

Research into using sunlight to convert methane into graphene led to an approach using electricity to produce graphite and hydrogen. The development reflected a practical commercialization requirement: a production system must be capable of continuous operation if it is to serve industrial customers consistently and move beyond the research stage.

2. ECONOMICS MUST SUPPORT SUSTAINABILITY

Many sustainability technologies struggle to gain adoption because they are not economically viable. Bringing hydrogen production and valuable carbon materials together within one solution offers a potential route forward. The commercial objective is to make the process attractive through useful outputs while addressing sustainability challenges and meeting the needs of industry.

3. REDUCE ENERGY, MAXIMIZE OUTPUT

Minimizing the energy needed for conversion while maximizing useful products represents a connected set of priorities. Both influence the commercial potential of methane processing. Lower energy requirements and the recovery of relevant carbon materials are central to assessing whether the technology can develop into an economically viable industrial manufacturing proposition.

4. LOCALIZE THE REACTION HEATING

Concentrating heating within the reaction zone aims to reduce unnecessary energy use. Rather than heating the surrounding environment, the intention is to supply heat where the reaction takes place. This supports the broader development objective of minimizing energy requirements while producing hydrogen and useful carbon materials from the methane feedstock.

5. RECOVER CARBON AS MATERIAL

Separating methane into hydrogen and solid carbon offers an alternative to conventional hydrogen production through steam methane reforming, which produces carbon dioxide emissions. Recovering carbon as a usable material creates another potential source of value alongside hydrogen. The approach connects emissions considerations with the commercial opportunities associated with producing useful industrial materials.

6. DIFFERENT FORMS, DIFFERENT MARKETS

Carbon occurs in different forms, including graphene, graphite and diamond, with distinct characteristics and potential applications. The type of carbon produced therefore matters to its commercial value. Evaluating recovery through specific materials and markets helps connect the conversion process with the requirements of industries that could use its different outputs.

7. HYDROGEN HAS INDUSTRIAL DEMAND

Hydrogen already serves industrial applications, including chemical reduction reactions and fertilizer production. These established uses provide context for assessing the hydrogen produced through methane conversion. Considering hydrogen alongside carbon materials brings both outputs into the evaluation of how the process can address industrial demand while strengthening the economic viability of production.

8. GRAPHITE CONNECTS TO BATTERIES

Graphite's importance in batteries illustrates an existing application for recovered carbon. This supports the argument for considering carbon materials as valuable outputs alongside hydrogen. Connecting production with relevant applications can contribute to the commercial attractiveness of the overall process and help identify markets where the material could meet industrial demand.

9. TARGET SPECIALIZED GRAPHENE APPLICATIONS

Electronics and membrane technologies offer areas of interest for graphene development, alongside applications in composites. The range of potential uses reinforces the importance of understanding different material forms. Development should connect the characteristics of the graphene produced with its intended application, linking production capabilities to the requirements of potential customers. ■

Top 9 Insights

Turning Graphene's Potential into Industrial Demand

Selçuk Doğulu, VP – Projects, EMSTEEL

1. STEEL AND CEMENT OFFER POTENTIAL

Steel and cement operations create potential entry points for graphene adoption. Interest spans both businesses, with discussions already taking place internally about possible uses. The opportunity is considered significant, although that interest remains prospective. Becoming an actual buyer will depend on how production capacity, pricing and relevant applications develop further.

2. COST COMPETITIVENESS DETERMINES ADOPTION

Cost competitiveness is central to decisions in steel and cement, where margins differ from those in applications such as batteries. Graphene must therefore fit the economics of the specific industrial market. Technical potential generates interest, but broader adoption will also require pricing that is competitive for the intended manufacturing application.

3. SCALE MUST SUPPORT COMPETITIVE PRICING

Greater production quantities and more competitive costs are expected to be necessary before direct purchasing becomes realistic. The issue is not a lack of belief in graphene's potential. It is whether supply and pricing have reached the point at which the material can be adopted commercially within larger industrial operations.

4. FOLLOW APPLICATIONS FURTHER DOWNSTREAM

Many potential applications sit beyond primary steel and cement production. The businesses buying those products may be the parties that actually incorporate graphene. Understanding where the material enters the manufacturing process is therefore essential to identifying the relevant buyer and connecting production with realistic opportunities further along the value chain.

5. IDENTIFY THE ACTUAL END USER

Ready-mix producers and cut-and-bend companies were identified as examples of potential downstream buyers. Their position illustrates why interest from a major industrial group does not necessarily translate into immediate direct procurement. Customer development needs to follow the application through the supply chain to the business that would use the material.

6. LOCAL PRODUCTION CARRIES STRATEGIC VALUE

Local production carries significant value in purchasing considerations. As a national industrial champion, the company places importance on manufacturing within the UAE and creating value domestically. Small potential savings from importing would not automatically outweigh that preference. A locally available product would therefore receive strong consideration as commercial opportunities develop.

7. DECARBONIZATION SUPPORTS AREAS FOR COLLABORATION

Decarbonization remains an important priority alongside cost competitiveness. Potential collaboration around advanced materials is viewed within that wider industrial agenda, with several possible areas of contact anticipated. However, the discussion did not establish an immediate purchase commitment, and direct use would still depend on the readiness of the relevant application.

8. EXPLORE POTENTIAL FEEDSTOCK CONNECTIONS

Captured carbon was raised as a possible additional connection, subject to whether it could be suitable for the production process. Existing captured carbon is currently supplied for enhanced oil recovery. This remained an exploratory question about a potential material source, rather than confirmation of a technically established graphene production route.

9. COMMERCIAL PARTICIPATION MAY DEVELOP GRADUALLY

Interest in graphene is positive, but the timing of direct adoption remains uncertain. Continued engagement could identify opportunities as production expands and costs become more competitive. The discussion distinguished between recognizing potential today and becoming a direct user, suggesting that commercial participation may develop gradually as the business case matures. ■

SOUNDINGS

CONNECT MANUFACTURING WITH MARKET OPPORTUNITY

"There is potential across numerous sectors, with connections to artificial intelligence, technology and defense. Looking at it from an investor's perspective, the combination of making products in the UAE and the scale of cement, construction and reconstruction creates a particularly interesting commercial picture. Those converging areas are where I see considerable market opportunity."

Gary King, President, ICE Abu Dhabi



SOUNDINGS

GRAPHENE ALIGNS WITH EMERGING PRIORITIES

"Graphene potentially enhances sectors already receiving considerable attention in the UAE, including renewable energy, battery technology and the energy requirements associated with artificial intelligence. That makes the timing of this development particularly interesting. What began as an exploration of methane conversion and emissions reduction has become a product opportunity connected to several major national initiatives, with manufacturing providing the link between the technology and the country's broader industrial development agenda."

Professor James McCallum, Chairman, Xergy Group



SOUNDINGS

ADOPTION REQUIRES TECHNOLOGY AND SPECIFICATIONS

"Building adoption requires two connected efforts: making graphene easier for industrial customers to use and working with government entities on specifications. Dispersions and intermediary products can reduce the research burden, while trials can help regulators become familiar with applications as they develop. The aim is to simplify the customer journey and ensure that, when graphene appears in specifications, businesses are ready to incorporate it into their products and processes commercially."

Dr. Colin Elcoate, Managing Director – MENA Region, Levidian



TOP 10 Recommendations

Building a Resilient Advanced Materials Value Chain

1. PRIORITIZE APPLICATIONS WITH CLEAR COMMERCIAL VALUE

Focus early commercialization on applications where graphene can solve a defined customer problem and justify its additional cost. Assess economic viability and market readiness together. Protective coatings, drilling fluids and thermal management may offer different entry points from cement and concrete, where larger potential volumes come with tighter pricing constraints.

2. GUARANTEE CONSISTENT QUALITY AND RELIABLE SUPPLY

Make repeatability a core requirement of the supply proposition. Demonstrate that material supplied for laboratory testing can be reproduced consistently for industrial trials and subsequent orders. Address customers' previous experiences of variable quality and limited availability by showing dependable production capability and a credible route to supplying larger commercial quantities.

3. CONVERT INDUSTRIAL TRIALS INTO OFFTAKE COMMITMENTS

Use initial production to support customer testing and establish practical evidence of performance. Move successful applications toward purchasing commitments that can underpin expansion. Scale later phases in step with credible offtake agreements that connect planned capacity with customer requirements, reducing the uncertainty between promising trials and sustained commercial demand.

4. MAKE GRAPHENE EASIER FOR CUSTOMERS TO ADOPT

Develop dispersions and intermediary products that fit customers' existing processes and capabilities. Offer powder where users want control over their formulations, alongside prepared alternatives for those with limited research resources. Reduce the technical burden of adoption through application guidance, appropriate product formats and support that reflects each customer's operating requirements.

5. BUILD APPLICATION EVIDENCE THROUGH TECHNICAL COLLABORATION

Work directly with customers to establish suitable testing methods, dispersion techniques and performance expectations. Match the material grade to the application rather than treating graphene as a universal additive. Demonstrate measurable benefits in the finished product and assess any engineering changes needed to move from laboratory results into industrial production.

6. ENGAGE REGULATORS AND DEVELOP RELEVANT SPECIFICATIONS

Bring government entities, regulators and project stakeholders into demonstration projects as applications develop. In construction particularly, adoption depends on more than technical performance: materials must fit project specifications and purchasing requirements. Use trial evidence to support informed consideration of graphene applications and prepare customers for potential changes in accepted specifications.

7. LOCATE PRODUCTION NEAR INPUTS AND CUSTOMERS

Build on locations that combine access to natural gas, electricity, existing infrastructure and efficient connections to prospective customers. Sharjah's experience highlights the value of using available assets while placing production close to industrial demand. Assess location decisions as manufacturing choices that support reliable supply, practical logistics and ongoing customer engagement.

8. EXPAND CUSTOMER DEVELOPMENT ACROSS THE VALUE CHAIN

Identify the businesses that actually incorporate graphene into products, including downstream processors, formulators and manufacturers. Large industrial groups may indicate market potential without being the immediate buyer. Extend engagement to smaller companies and provide the technical education needed to connect local production with specific applications and realistic routes to procurement.









9. MAINTAIN ROBUST ECONOMICS AS CAPACITY GROWS

Assess gas and electricity costs alongside customer pricing and production scale. Explore solar power and suitable flare gas and other underutilised gas streams sources where they strengthen the business case. Treat hydrogen commercialization as an additional opportunity while ensuring that graphene production economics remain credible without relying on an established hydrogen market or speculative revenues.

10. BUILD LOCAL CAPABILITY THROUGH INDUSTRIAL PARTNERSHIPS

Connect producers, technology developers, industrial users and research expertise to support commercialization in the UAE. Use partnerships to bring proven application technologies into local manufacturing, strengthen customer confidence and develop practical knowledge. Grow capacity alongside validated demand so that local production supports a durable advanced materials industry with commercial foundations. ■



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