STRATEGIC ANALYSIS

Nano One Materials & VW LFP Supply Chain Canada

Strategic Positioning, Competitive Analysis and Supply Chain Potential

May 2026 | Based on publicly available sources

Executive Summary

Volkswagen/PowerCo faces a critical supply question: where will the Gigafactory in St. Thomas, Ontario source its LFP cathode active material (CAM) from 2027 onwards? This analysis demonstrates that Nano One Materials is the only operative LFP CAM source in all of North America, has been VW's research partner since 2019, and is ideally positioned in Québec – surrounded by an emerging Canadian ecosystem comprising Patriot Battery Metals (lithium), Mangrove Lithium (refinery) and PowerCo (cell manufacturing). A direct partnership between Nano One and VW/PowerCo has not been publicly confirmed, but the strategic logic is exceptionally compelling.

1. Starting Point: VW Elli PowerCenter & LFP Strategy

1.1 The Elli PowerCenter in Salzgitter

In March 2026 Volkswagen, through its energy subsidiary Elli, commissioned the first large-scale stationary battery storage facility in Salzgitter. The system delivers 20 MW of power and 40 MWh of storage capacity, connected to the European power exchange EPEX. VW CEO Oliver Blume described energy storage and energy trading as 'a new strategic business area with growth potential'.

Parameter	Value
Power output	20 MW
Capacity	40 MWh
Location	Salzgitter, Germany
Operator	Elli (Volkswagen Group Charging GmbH)
Market	EPEX (European Power Exchange)
Cell basis	PowerCo Unified Cell (chemistry unspecified; LFP logical for ESS)

1.2 VW's Unified Cell & LFP Chemistry

The technological basis of the large-scale storage is the PowerCo Unified Cell – VW's group-wide standard cell to be used in up to 80% of future electric vehicles. Its chemistry flexibility is key:

- LFP (Lithium Iron Phosphate): For entry-level segments and stationary storage – cost optimum
- NMC (Nickel-Manganese-Cobalt): For volume and premium vehicles – performance optimum
- Sodium-Ion: In development
- Solid-State: Long-term vision (with QuantumScape)

For large-scale stationary storage like the Elli PowerCenter, LFP is the obvious chemistry choice: cheaper, longer-lasting, thermally more stable and lower maintenance than NMC – exactly the properties that matter for grid storage.

1.3 VW's LFP Partner Network at a Glance

Partner	Country	Level	Role
Gotion High-Tech	China	Cell	LFP Unified Cells, 20 GWh/a Hefei, delivery 2026–2032; VW is largest shareholder
IBU-Tec	Germany	CAM	LFP cathode material, supply contract + JDA with PowerCo, 3,000 tpa → 15,000 tpa by 2028 (Bitterfeld)
IONWAY (Umicore/Power	Europe	CAM/pCAM	NMC cathode supply for European gigafactories; 160 GWh

Co JV)			target by 2030; focused on Europe, NOT Canada
Nano One Materials	Canada	CAM Technology	VW Group Research partner since 2019; LFP specialist; Québec
Patriot Battery Metals	Canada	Raw material	VW invests C$69M (9.9%); offtake 100,000 t/a spodumene concentrate for 10 years; Québec

2. Nano One Materials Corp. – Company Analysis

2.1 Company Profile

Nano One Materials Corp. (TSX: NANO, OTCQB: NNOMF) is a Canadian process technology company headquartered in Burnaby, British Columbia, aiming to revolutionize the industrial production of cathode active materials for lithium-ion batteries. Its production facility (pilot line and demonstration line) is located in Candiac, Québec – the only operative LFP CAM production facility in all of North America.

Metric	As of Dec 2025 / Q1 2026
Stock listing	TSX: NANO | OTCQB: NNOMF | Frankfurt: LBMB
Revenue	USD 0 (pre-revenue; first revenues targeted end 2026)
Working capital	CAD 22.3M (Dec 31, 2025)
Current capacity	~200 tpa (pilot line, operative since Q4 2023)
Target capacity	~800–1,000 tpa (demonstration line, target H1 2027)
Patents	52+ granted patents worldwide; further pending
Government funding	Over CAD 63M non-dilutive capital since 2024 (DoD USA, NRCan, IQ, Québec, NGen)

2.2 One-Pot™ Process Technology – The Unique Selling Proposition

Nano One's patented One-Pot™ process combines pCAM and CAM processing in a single reaction step, producing LFP directly from non-sulfate metal compounds – without wastewater, without sodium sulfate by-products.

Parameter	One-Pot™	Conventional (China)
Capital expenditure (CapEx)	**−30% vs. comparable plant**	Basis (100%)
Operating costs (OpEx)	**−30%**	Basis (100%)
Energy consumption	**−80%**	Basis (100%)
Process water	**−80%**	Basis (100%)
GHG emissions	**−50–60%**	Basis (100%)
Wastewater (sodium sulfate)	**None (eliminated)**	Substantial
Chinese precursors (pCAM)	**Not required**	Dependent

Comparison basis: Two 25,000 tpa North American plants, independently validated by Worley and Strategic Analysis, Inc. (November 2024 / February 2026).

2.3 Strategic Partnerships

Partner	Since	Role & Status

VW Group Research	2019	Research partner in cathode material consortium (alongside Pulead and Saint-Gobain); LFP and NMC process development
Sumitomo Metal Mining (SMM)	2023	Strategic investor (CAD 16.9M = 4.9%); technology partner for LFP commercialization; confirmed One-Pot as core technology in own LFP growth strategy; NRCan project partner
Rio Tinto	2022	Strategic investor (USD 10M = 4.9%); pre-qualification of lithium carbonate from Argentina (Fenix, Olaroz, Rincon) as production feedstock
Worley (Chemetics + Comprimo)	2024	License and alliance agreement; joint development of commercial One-Pot LFP CAM Package (target: launch H1 2026); Design-One-Build-Many strategy
US Department of Defense (DoD)	2024	USD 12.9M (DPA Title III); expansion of Candiac facility; recognition as strategic national asset
ALTA (Arkansas Lithium Tech Accelerator)	2025	One of three selected participants in inaugural cohort; US market development

3. PowerCo Gigafactory St. Thomas – The Strategic Gap

3.1 Project Overview

Parameter	Details
Location	St. Thomas, Ontario, Canada
Target capacity	Up to 90 GWh/a (full buildout)
Production start	2027 (initial production); gradual ramp-up
Investment volume	Up to €4.8B / CAD 7B by 2030
Cell format	Unified Cell (prismatic); LFP, NMC and further chemistries possible
Anode	Synthetic graphite from NOVONIX (Chattanooga, TN); supply agreement confirmed
Lithium source	Patriot Battery Metals (Québec); VW investment C$69M; 100,000 t/a spodumene concentrate
LFP CAM source	NOT CONFIRMED – largest strategic gap in the Canadian supply chain
CAM Europe	IBU-Tec (LFP, Germany, 10-year contract); IONWAY/Umicore (NMC, Poland)

3.2 The LFP CAM Supply Gap in Canada

The critical question: where does PowerCo St. Thomas source its LFP cathode active material from 2027? Several factors create a structural gap:

- IONWAY (PowerCo/Umicore JV): Exclusively focused on European gigafactories (Salzgitter, Valencia). No Canada activities confirmed.
- Umicore Ontario: Planned CAM plant in Loyalist Township (Kingston) has been shelved. Moreover, Umicore focused on HLM (High Manganese), not LFP.
- IBU-Tec: German company, LFP supply contract only for Salzgitter. No Canada activities.
- Gotion: Delivers finished LFP cells (not CAM) from China. No CAM production in Canada.

Key Finding

There is not a single confirmed, operative manufacturer of LFP cathode active material in all of North America with sufficient capacity and qualification for automotive applications – except Nano One Materials in Candiac, Québec.

4. Competitive Analysis: LFP CAM Suppliers for St. Thomas

4.1 Comparison Matrix

Company	Location	Capacity today	VW connection	Canada site	LFP CAM active	Realistic 2027
Nano One	Québec, CA	~200 tpa → 800 tpa H1/27	Research partner since 2019	✅ **Yes**	✅ **Yes**	✅ **Yes**
6K Energy	Tennessee, USA	~400 tpa (CoE)	None	❌ **No**	✅ **Yes**	⚠️ **Partial**
Sylvatex	California, USA	~10 kg/day	None	❌ **No**	⚠️ **Partial**	❌ **No**
IBU-Tec	Germany	3,000 tpa → 15,000 tpa	PowerCo supply contract (Europe)	❌ **No**	✅ **Yes**	❌ **No**
NOVONIX	Tennessee, USA	n/a (no LFP CAM)	PowerCo customer (graphite anode)	❌ **No**	❌ **No**	❌ **No**
Ultion Tech.	Nevada, USA	No own CAM	None	❌ **No**	❌ **No**	❌ **No**
Integrals Power	UK	20 tpa (pilot, UK)	None	❌ **No**	⚠️ **Partial**	❌ **No**
First Phosphate	Québec, CA	No CAM (raw material)	None	✅ **Yes**	❌ **No**	❌ **No**

4.2 Assessment of US Alternatives

Even with US supply, 6K Energy remains the only serious candidate with actual LFP CAM production. However, structural disadvantages apply:

- Tennessee is significantly further from St. Thomas, Ontario than Candiac, Québec
- No research partnership with VW/PowerCo
- NDAA requirements from 2027 favour Canadian sources for Canadian plants
- Current Canada-USA trade conflict and tariff uncertainties make US sources riskier

5. The Emergence of a Canadian LFP Supply Chain

5.1 The Four Actors

For the first time in North American history, a complete domestic LFP battery value chain is taking shape – and all links are located in Québec or Ontario:

① RAW MATERIAL	② REFINERY	③ LFP CAM	④ CELL
Patriot Battery Metals James Bay, Québec Spodumene Concentrate	**Mangrove Lithium** Delta, BC → planned Eastern Canada LiOH + $LiCO_3$	**Nano One Materials** Candiac, Québec LFP Cathode Material	**PowerCo / VW** St. Thomas, Ontario Unified Cell (LFP)

5.2 Patriot Battery Metals – VW's Lithium Source

VW invested C$69M for 9.9% of Patriot Battery Metals in December 2024, securing a binding offtake agreement for 100,000 tonnes of spodumene concentrate (SC5.5) per year over 10 years. The Shaakichiuwaanaan project in Québec's James Bay region is the largest lithium pegmatite resource in the Americas (108 Mt at 1.40% Li2O). Importantly: Patriot operates no refinery of its own – the spodumene must be processed externally into LiOH or LiCO3. Patriot's mine feasibility study targets completion in 2026–2027, with first spodumene production no earlier than 2028.

5.3 Mangrove Lithium – North America's First Lithium Refinery

Mangrove Lithium opened North America's first commercial electrochemical lithium refinery in Delta, British Columbia on April 16, 2026 (1,000 tpa LiOH). Particularly relevant:

- Mangrove produces both lithium hydroxide and lithium carbonate – Nano One's One-Pot process specifically requires lithium carbonate
- Planned 20,000 tpa refinery in Eastern Canada/Québec – geographic proximity to Candiac
- Investors: Canada Growth Fund, BMW i Ventures, Breakthrough Energy Ventures, Mitsubishi Corporation, Asahi Kasei
- Current feedstock MOU with Élévra/North American Lithium (NAL), not Patriot – but the business model is feedstock-flexible

A direct Patriot→Mangrove link has not been confirmed. However, VW as a common stakeholder could facilitate the connection.

5.4 Nano One – The Missing Link

Nano One is the critical missing link between the lithium refinery and PowerCo's cell production in Canada. Three factors make the position unique:

- Only operative LFP CAM production in North America (Candiac, Québec)
- One-Pot process uses lithium carbonate as direct input – compatible with Mangrove output and Rio Tinto-Argentina sources
- VW Group Research partner since 2019 – VW knows the technology first-hand

6. Strategic Assessment: Nano One's Position

6.1 Strengths (Strategic USP)

Strength	Assessment
Geographic monopoly	Only operative LFP CAM facility in North America; in Québec, 6h from St. Thomas
VW research partnership	Since 2019; VW knows One-Pot technology; trust built over several years
Technology differentiation	−80% energy, −30% CapEx vs. conventional; no wastewater; simpler permitting
Strong strategic partners	SMM (investor + technology partner), Rio Tinto (investor + lithium pre-qualification), Worley (licence package)
Government backing	Over CAD 63M non-dilutive; DoD USA, NRCan, IQ, NGen, Québec; IEA mention
Regulatory tailwind	NDAA 2027 (PFE exclusion), G7 Critical Minerals Plan, 45X Tax Credit; FEOC compliance
Licence model (Design-One-Build-Many)	Scales without proportional capital requirements; Nano One can serve VW as licensee, JV partner or direct supplier
IP portfolio	52+ granted patents in key jurisdictions; continuous expansion

6.2 Risks & Limitations

Risk	Assessment
No revenue (pre-revenue)	No commercial supply agreements yet; first revenues targeted end 2026 (defence/ESS)
Scale gap	800–1,000 tpa target by H1 2027 vs. 60,000+ tpa needed for full 90 GWh operation; 25,000 tpa plant is paper planning only
No confirmed VW supply contract	Research partnership ≠ supply contract; no LOI or MOU on commercialization publicly known
Financial tightness	CAD 22.3M working capital; burn rate ~CAD 12–13M/a (operational, before grants); heavy government dependency
Umicore/BASF JDAs terminated	Only NMC projects terminated, not LFP; strategically consistent, but reputational question remains
Long qualification process	Automotive OEM qualification typically takes 2–4 years; A→B→C→D sample process required
Refinery gap	No confirmed Canadian lithium refinery partner (Patriot → Mangrove = not formalised)

7. PowerCo Strategic Outlook: From pCAM Problem to One-Pot Solution

7.1 The IBU-Tec JDA as Benchmarking Instrument

The IBU-Tec JDA with PowerCo for EUR 6 million explicitly targets the development of an industrialisation concept for LFP pCAM (iron phosphate precursor) using spray drying technology – the conventional path to overcoming dependency on Chinese FePO4. Nano One's One-Pot process makes this entire problem statement obsolete: it starts directly from iron oxides and metal powders; FePO4 never exists as an intermediate product. If PowerCo licences One-Pot, not only does the pCAM problem disappear, but the entire justification for the JDA vanishes.

The JDA is therefore not an obstacle to One-Pot – it is a benchmarking instrument: PowerCo has the conventional approach industrially validated and costed to obtain a robust cost comparison for alternative processes like One-Pot. EUR 6M for market transparency is, from PowerCo's perspective, a cheap insurance premium.

Parameter	IBU-Tec JDA (conventional)	Nano One One-Pot
Approach	Solve the pCAM problem	Eliminate the pCAM problem
Strategy	Optimise conventionally	Rethink process architecture
Investment	EUR 6M for industrialisation concept	Licence fee + ISBL package
Result for PowerCo	European FePO4 source	No FePO4 needed

7.2 The Three Phases of PowerCo's Strategy

Phase 1 – Short-term (2025–2028): Parallel Paths – Deliberate Risk Diversification

IBU-Tec delivers conventionally for Europe (Salzgitter, Valencia). Nano One is qualified as the LFP CAM source for St. Thomas – initially in limited volumes as the North American first mover. The IBU-Tec JDA runs through and delivers robust cost data for the conventional pCAM approach. PowerCo benchmarks both paradigms simultaneously – conventional and One-Pot – without making a strategic commitment.

Phase 2 – Medium-term (2028–2032): The Cost Comparison Decides

When both processes operate at industrial scale, PowerCo has real operating data: IBU-Tec process with pCAM stage and Bitterfeld spray tower versus One-Pot without pCAM and with 80% lower energy consumption. The 30% CapEx and OpEx advantage validated by Worley at Class 3 level is then no longer a projection but backed by own operational experience. The decision for new capacities becomes a financial discussion – no longer a technology discussion.

Phase 3 – Long-term (2030+): IBU-Tec as One-Pot Licensee

If PowerCo standardises One-Pot for new capacities, it does not need to operate the process itself. IBU-Tec has the ideal infrastructure: 16 rotary kilns – for which One-Pot material is optimally suited – spray dryers, LFP production know-how and an established PowerCo supplier relationship. As a Nano One licensee, IBU-Tec would eliminate its own pCAM bottleneck, operate the Bitterfeld site more efficiently and simultaneously represent Europe's answer to the Chinese process chain. IBU-Tec would remain relevant – but as a One-Pot operator rather than a conventional pCAM developer.

Core thesis: The strategy is not either-or

PowerCo uses IBU-Tec short-term as the European safety anchor for LFP CAM, establishes Nano One as the North American first supplier for St. Thomas, and decides by 2028 at the latest – based on real operating data – whether One-Pot becomes the global CAM standard technology for new PowerCo capacities, potentially with IBU-Tec as the first European licensee. The strategy reads: first parallel, then compare, then standardise.

7a. St. Thomas: The Table Is Not Yet Set

7a.1 Confirmed vs. Open Supply Chain Positions

PowerCo St. Thomas is on schedule for a 2027 production start – buildings are rising, power is secured, staffing is underway. Yet behind this construction facade lies a substantial supply gap for the most critical cell inputs. As of May 2026, there is exactly one confirmed material supplier: NOVONIX for synthetic graphite (anode). All other key components remain unconfirmed.

Component	Status	Confirmed Supplier	Gap / Risk
Anode (Graphite)	✅ **Confirmed**	NOVONIX (Tennessee, USA) 32,000 t/a from 2027	No Canadian supplier; US origin
Cathode NMC (CAM)	❌ **Open**	No Canadian supplier confirmed	IONWAY covers Europe only; Umicore Kingston shelved; import from Asia/Europe likely for ramp-up
Cathode LFP (CAM)	❌ **Open**	Nano One (Candiac, QC) – only possible Canadian source; 800 tpa from H1 2027	Largest strategic gap; no alternative North American offer; CRITICAL
Lithium (refined)	⚠️ **Open**	Patriot: spodumene earliest 2028; no refinery partner confirmed	Mangrove Eastern Canada: build 2027, production 2028 (conditional); Nano One uses Rio Tinto (Argentina) interim
Electrolyte	❌ **Open**	No Canadian supplier known	Import from Asia expected for ramp-up
Separator	❌ **Open**	No Canadian supplier known	Import from Asia/Europe expected for ramp-up
Power (CO2-free)	✅ **Confirmed**	Hydro One (Ontario)	Fully secured

7a.2 The Timeline Gap: No Canadian Cathode Ecosystem Until 2027

Milestone	Timing	Note
PowerCo St. Thomas first production	**2027**	On track; NMC cells initially, LFP later
Nano One 800 tpa demonstration line	**H1 2027**	Simultaneous; first LFP CAM source in North America; supply agreements targeted end 2026
Patriot: first spodumene production	**2028+**	No conversion partner confirmed; spodumene ≠ LiCO3
Mangrove Eastern Canada refinery (LiCO3)	**End 2028**	Conditional; build start 2027; Eastern Canada/QC site not yet confirmed
Patriot conversion plant	**2031+**	MOU exploration only; no concept, no

(LiCO3/LiOH)		timeline, no budget

7a.3 Rio Tinto, VW and Nano One – The Indirect Connection

A direct partnership between Rio Tinto and VW/PowerCo is not publicly known. Rio Tinto's automotive partnerships include BMW (aluminium), Ford (battery raw materials) and Volvo Group – not Volkswagen. The only connection between Rio Tinto and VW runs exclusively through Nano One: Rio Tinto invested USD 10M in Nano One and supplies pre-qualified lithium carbonate from Argentina (Rincon, Salar del Hombre Muerto) – exactly the feedstock format required by Nano One's One-Pot process. VW has been Nano One's research partner since 2019. This makes Nano One the sole nexus between these two heavyweights.

For Nano One, this position is strategically valuable: as long as no Canadian lithium refinery is operative, Rio Tinto's Argentine lithium carbonate remains the only immediately available, pre-qualified and non-Chinese LiCO3 source for the Candiac facility – and therefore indispensable until at least 2029/2030.

7a.4 The Operational Urgency: PowerCo is Searching for Suppliers – Now

PowerCo has publicly confirmed that the 'formal identification of key suppliers' is the outstanding next strategic step – decisions expected to trigger a second wave of new construction in the St. Thomas supplier park. This statement dates from September 2024 and essentially still holds today. The clock is ticking: any CAM supplier wishing to qualify for 2027 must enter the qualification phase at the latest now – automotive A-B-C sample processes take 2–4 years.

Two additional factors substantially increase the pressure. First, VW has announced it intends to open PowerCo to external partners – whoever joins will co-shape procurement strategy and has a vested interest in a closed, cost-efficient supply chain. Second, Ontario has damaged its reputation as a secure EV supply chain location after the withdrawal or delay of Honda, Stellantis/LG and Umicore – PowerCo is the only major project still moving forward, bearing the entire industrial policy burden of the province.

Core Finding: The Largest Strategic Gap of PowerCo St. Thomas

There is not a single confirmed, operative manufacturer of LFP cathode active material in all of North America with sufficient capacity and qualification for automotive applications – except Nano One Materials in Candiac, Québec. The cathode is the most expensive, quality-critical and strategically significant component of a battery cell. PowerCo will manage the St. Thomas ramp-up in 2027 with imported materials – but localising this supply chain is not merely a cost question; it is a political commitment to the Canadian government that has provided billions for this gigafactory. The table is half set. The most important ingredient is still missing.

8. Conclusion & Outlook

8.1 Core Theses

1 **Nano One has a structural unique selling position in North America**
As the only operative LFP CAM manufacturer on the continent, with a VW research partnership and Canadian location, there is no comparable alternative for PowerCo St. Thomas – neither in Canada nor in the United States.

2 **The Canadian LFP supply chain is forming – all links exist**
Patriot Battery Metals (lithium) → Mangrove Lithium (refinery) → Nano One (LFP CAM) → PowerCo (cells): this Québec-Ontario chain is not coincidence but the result of coordinated industrial policy by the Canadian government and VW's strategic investments.

3 **The critical milestones of the next 18 months are decisive**
Whether Nano One converts its strategic advantage into a commercial contract depends on three things: (1) First commercial LFP revenues by end of 2026, (2) Proof of 800 tpa capacity by H1 2027, (3) At least one credible first-customer reference from the defence or ESS segment.

4 **The unique selling position is real – the contract is not yet**
The strategic logic for a Nano One – VW/PowerCo partnership is exceptionally strong. However, a clear claim to an exclusive partnership only exists once Nano One demonstrates commercialisation. The next 12–18 months are the decisive test phase.

8.2 Key Indicators to Watch

- Nano One: First commercial LFP supply agreements (end 2026)
- Nano One: Completion and market launch of One-Pot LFP CAM Package with Worley (H1 2026)
- Nano One: Qualification progress with named major cell manufacturers
- PowerCo: Announcement of an LFP CAM supplier for St. Thomas
- Mangrove Lithium: Site decision for planned 20,000 tpa refinery in Eastern Canada/Québec
- Patriot Battery Metals: Feasibility study result; downstream partnership (refinery)
- Canada policy: NDAA implementation 2027; G7 Critical Minerals Action Plan progress
- PowerCo: External investor/partner announcement (co-shareholder in PowerCo SE)

Prepared: May 2026