Truflation

Truflation EV Commodity Index (TruEV)

Methodology

February 5, 2026

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1. Executive Summary

The Truflation Electric Vehicle Commodity Index (TruEV) is designed to capture the core commodities essential to the production of electric vehicles by linking vehicle production volumes with the raw materials required for their batteries. The TruEV index measures the number of electric vehicles produced across four distinct EV categories and multiplies this by the underlying commodity inputs needed for each vehicle type. In aggregate, this methodology produces a representative basket of commodities that reflects overall EV production activity and demand.

The EV Index provides a reliable and transparent benchmark for tracking price movements of the critical materials used in electric vehicle manufacturing. Its objective is to deliver actionable insights into production trends, supply dynamics, and input costs faced by EV manufacturers, while accurately reflecting the rapidly evolving landscape of the global electric vehicle market.

The methodology begins by defining the primary categories of electric vehicles, recognizing that each has unique battery technologies and material requirements:

- Battery Electric Vehicles (BEVs)
- Hybrid Electric Vehicles (HEVs)
- Plug-in Hybrid Electric Vehicles (PHEVs)
- Fuel Cell Electric Vehicles (FCEVs)

Distinguishing between these vehicle types is fundamental, as variations in drivetrain architecture and battery chemistry directly influence demand for specific commodities.

The TruEV Index focuses on the metals most integral to EV and battery production, selected for their material significance and sensitivity to industry growth. They are Nickel, Cobalt, Copper, Palladium, Platinum and Lithium.

These commodities play critical roles in battery performance, power electronics, and catalytic processes, making their price movements highly relevant to EV production economics.

Commodity prices are sourced from reputable global market exchanges and supplemented with data from industry-leading research providers, as well as direct inputs from EV manufacturers where applicable. This multi-source approach ensures data accuracy, robustness, and comprehensive market coverage. A defining feature of the TruEV Index is its annual weight recalibration, designed to maintain alignment with current market conditions. Recalibration considers:

- Metal intensity per vehicle by EV type
- Production-based market share of each EV category
- Prevailing commodity prices at the rebalancing date.

This dynamic weighting framework allows the index to adapt to technological advancements, shifts in production trends, and changes in commodity markets. The TruEV Index is calculated with a base date of January 1, 2018, providing a consistent reference point for historical comparison and long-term performance analysis.

The methodology is supported by a robust governance and compliance framework, including adherence to international financial benchmark standards and regular audits to ensure methodological integrity and accuracy.

Transparency is a core principle of the TruEV Index. Detailed documentation covering methodology, data sources, and calculation procedures is outlined in this document with Governance protocols addressing potential conflicts of interest, ensuring the index remains an objective and unbiased measure of the EV commodity market.

The institutional grade Truflation Electric Vehicle Commodity Index represents a rigorous and comprehensive approach to measuring the materials that underpin the global transition to electric mobility. By integrating vehicle production data with commodity demand and pricing, the index provides stakeholders with a powerful tool for understanding, tracking, and navigating the complex dynamics of the EV commodity ecosystem.

2. Definitions of the Types of Electric Vehicles

Electric vehicles represent a broad category of transportation technologies designed to reduce reliance on conventional internal combustion engines and lower greenhouse gas emissions. Rather than relying solely on fossil fuels, EVs use electricity—either stored in batteries or generated onboard—to power an electric motor. Over time, different EV architectures have emerged, reflecting technological progress, infrastructure availability, and varying use cases. These architectures are generally grouped into four main categories: Battery Electric Vehicles (BEVs), Hybrid Electric Vehicles (HEVs), Plug-in Hybrid Electric Vehicles (PHEVs), and Fuel Cell Electric Vehicles (FCEVs).

- *Battery Electric Vehicles (BEVs):* Battery Electric Vehicles are fully electric vehicles powered exclusively by electricity stored in rechargeable battery packs. BEVs do not contain an internal combustion engine and therefore produce zero tailpipe emissions. Electricity is supplied to the battery through external charging infrastructure, such as home chargers or public charging stations.
- *Hybrid Electric Vehicles (HEVs):* Hybrid Electric Vehicles combine a conventional internal combustion engine with an electric motor and a small battery. Unlike fully electric vehicles, HEVs do not require external charging. Instead, the battery is charged through regenerative braking and by the engine during operation. HEVs serve as a transitional technology, offering improved efficiency without the need for charging infrastructure, making them suitable for regions where electric charging networks are limited.
- *Plug-in Hybrid Electric Vehicles (PHEVs):* Plug-in Hybrid Electric Vehicles build on the hybrid concept by incorporating a larger battery that can be charged from an external power source. This allows PHEVs to operate purely on electric power for a limited range before switching to hybrid mode, where the internal combustion engine provides additional power. PHEVs offer greater flexibility than HEVs by enabling short-distance, zero-emission driving while retaining the extended range and convenience of a traditional fuel-powered vehicle. They are often viewed as a bridge technology, easing the transition from combustion engines to fully electric vehicles.
- *Fuel Cell Electric Vehicles (FCEVs):* Fuel Cell Electric Vehicles generate electricity onboard using hydrogen fuel cells. Hydrogen stored in high-pressure tanks reacts with oxygen to produce electricity, which powers the electric motor. The only tailpipe emission from this process is water vapor. FCEVs combine the benefits of electric drivetrains with fast refueling times similar to conventional vehicles.

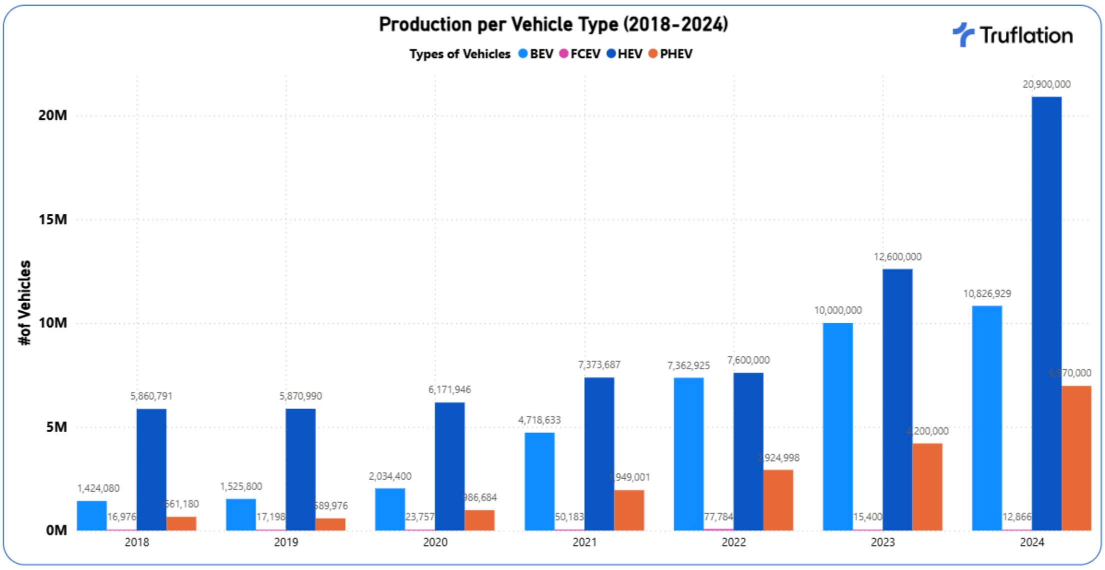
Each EV type reflects a different approach to electrification, shaped by technological maturity, infrastructure availability, and energy policy. BEVs represent full electrification, HEVs and PHEVs provide transitional pathways, and FCEVs offer an alternative zero-emission solution dependent on hydrogen infrastructure.

To enhance understanding of the evolving electric vehicle (EV) market, it is important to examine production trends across each EV category since 2018. These trends provide valuable insight into shifting consumer preferences, levels of market adoption, and the relative growth trajectories of different EV technologies.

Production data over this period highlights how advancements in technology, infrastructure development, and regulatory support have influenced the composition of the EV market. Analyzing these patterns helps contextualize changes in demand for underlying components and materials, as well as the broader dynamics shaping the industry.

Exhibit 1 illustrates the annual production trends for the EV types from 2018 to 2024, offering a comparative view of growth and market penetration across Battery Electric Vehicles (BEVs), Hybrid Electric Vehicles (HEVs), Plug-in Hybrid Electric Vehicles (PHEVs), and Fuel Cell Electric Vehicles (FCEVs).

Exhibit 1: Annual Production Data for EV Types (2018-2024)



Source: LMC Automotive. EV Volumes, Car Manufacturers public reports

3. Metals Used in Electric Vehicles Production

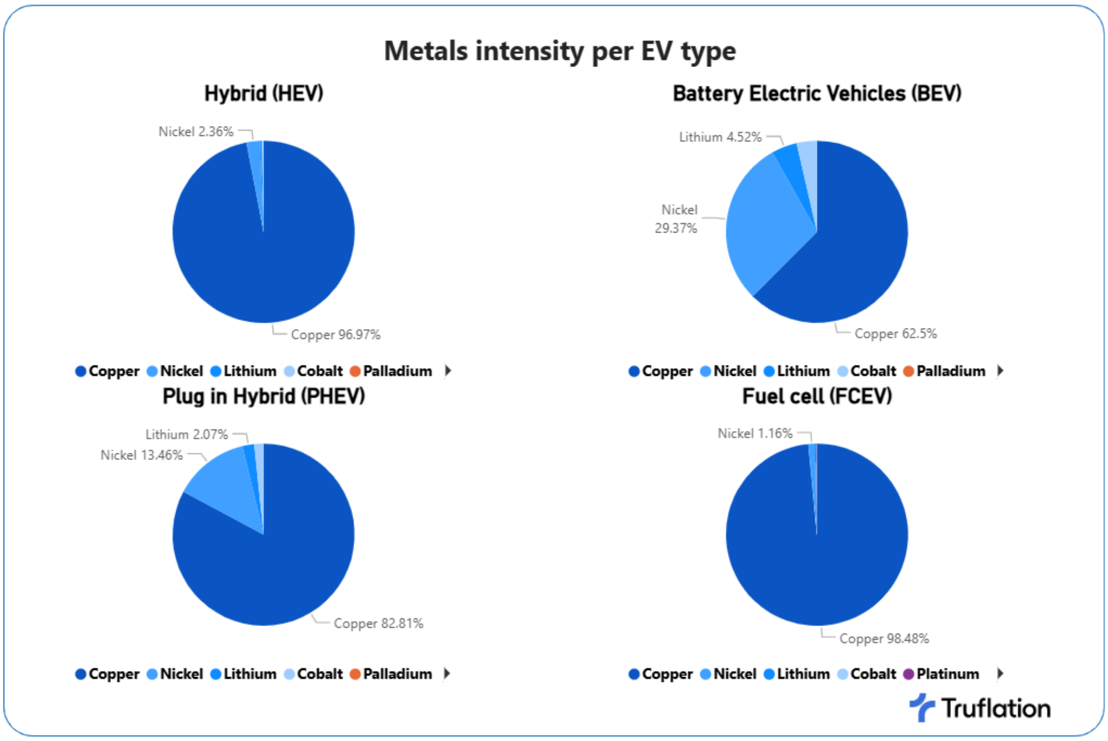
The Truflation EV Commodities Index monitors six key commodities that are essential to the manufacturing of electric vehicles, incorporating their use across batteries, electric motors, fuel cells, and other critical EV components. These commodities have been selected based on their fundamental roles in EV production and the material impact that their price movements have on the economics of the EV industry.

- *Nickel:* Nickel is a core component in the cathodes of lithium-ion batteries, where it enhances energy density and storage capacity; key performance drivers for Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs). In addition, nickel is used in stainless steel and specialized alloys required for various structural and mechanical EV components.

- *Cobalt:* Cobalt is a critical input in lithium-ion battery chemistries, valued for its ability to improve battery stability, extend cycle life, and support thermal management. Its use is particularly prominent in BEVs and PHEVs, where safety and long-term performance are essential.
- *Copper:* Copper is indispensable across all EV types due to its exceptional electrical conductivity. It is widely used in electric motors, wiring harnesses, power electronics, and charging infrastructure. As EV adoption accelerates and supporting infrastructure expands, demand for copper is expected to increase significantly.
- *Palladium:* Although not used directly in EV batteries, palladium plays a key role in catalytic converters for HEVs, PHEVs and internal combustion engine (ICE) vehicles. Its inclusion reflects the transitional nature of the automotive market as it shifts toward lower-emission and electrified powertrains.
- *Platinum:* Platinum is a critical catalyst in hydrogen fuel cells used by Fuel Cell Electric Vehicles (FCEVs). While FCEVs currently represent a smaller share of total EV production, the inclusion of platinum anticipates the potential long-term growth of hydrogen-based mobility solutions.
- *Lithium:* Lithium is the foundational material for lithium-ion batteries, owing to its lightweight properties and high electrochemical potential. It enables the production of high-energy-density batteries that are essential across BEVs, PHEVs, and HEVs, and it also supports energy storage systems associated with FCEVs. Lithium's central role underpins the broader transition toward electrified and low-emission transportation technologies.

The accompanying chart provides a clear visual representation of the relative quantities of each metal used across different EV types, helping to illustrate their respective roles and importance within the electric vehicle value chain.

Exhibit 2: Metals Used in each of the EV Types in 2025



Source: www.iea.org; www.globaldata.com; https://elements.visualcapitalist.com/

4. The Truflation EV Commodities Index Framework

The construction of the Truflation EV Commodities Index involves the weighting of each metal within the EV Index, which is a core component of the methodology and is designed to reflect its relative importance in electric vehicle production. To ensure ongoing relevance and accuracy, metal weights are recalculated on an annual basis using a systematic, data driven approach that captures the evolving dynamics of both the EV market and underlying commodity prices.

Step 1: Metal Amount for each EV Type in Kg
For each electric vehicle type, the index begins by estimating the physical metal needed for each EV vehicle type; which are:

- Battery Electric Vehicles (BEVs)
- Hybrid Electric Vehicles (HEVs)
- Plug-in Hybrid Electric Vehicles (PHEVs)
- Fuel Cell Electric Vehicles (FCEVs)

For each EV type Truflation creates a metal intensity value, expressed in kilograms per vehicle. This produces a metal intensity matrix:

Metal Amount (Kg) = Weight in Kg of each metal for each vehicle type

Exhibit 3: Metals Used in each of the EV Types

EV type	Nickel (kg)	Copper (kg)	Cobalt (kg)	Palladium (kg)	Lithium (kg)	Platinum (kg)
BEV	39.0	83.0	4.80	0.0000	6.00	0.0000
HEV	0.975	40.0	0.12	0.0026	0.15	0.0003
PHEV	9.75	60.0	1.20	0.0026	1.50	0.0003
FCEV	0.975	83.0*	0.12	0.0000	0.15	0.0400

* For FCEV Copper, value is set to 83.kg as a pragmatic 'electric driven class' placeholder

Step 2: Metal Intensity

The metal intensity is then converted into a cost-weighted metal exposure by multiplying each metal's kilogram requirement by its price.

Metal Intensity = Weight in Kg of each metal for each vehicle type
x Price per metal in Kg

This reflects the monetary value of metal inputs embedded in one vehicle of each EV type.

Step 3: Production Market Share Integration

Not all EV types contribute equally to global metal demand. Their importance depends on how many are produced. The production of each EV type per year is listed out in Exhibit 4.

Exhibit 4: Production of each EV Types per year

EV type	2018	2019	2020	2021	2022	2023	2024
BEV	1,424,080	1,525,800	2,034,400	4,718,633	7,362,925	10,000,000	10,826,929
HEV	5,860,791	5,870,990	6,171,946	7,373,687	7,600,000	12,600,000	20,900,000
PHEV	661,180	589,976	986,684	1,949,001	2,924,998	4,200,000	6,970,000
FCEV	16,976	17,198	23,757	50,183	77,784	15,400	12,866
TOTAL	7,963,027	8,003,964	9,216,787	14,091,504	17,965,707	26,815,400	38,709,795

For each EV type, a contribution percentage is calculated by dividing the production volume of that EV type by total EV production. The resulting contribution percentages for each EV type are then multiplied by each metal intensity for each EV type. An illustrative example of this step is highlighted in Exhibit 5 below:

Exhibit 5: Production Percentage of each the EV Types per year

EV TYPE: BEV					
	Step 1	Step 2		Step 3	
	Metal Weight in Kg	Price per Metal in Kg	Metal Intensity	EV Contribution to total EV production	Weighted Metal Intensity (Metal Intensity x Contribution)
Nickel	39.0	15.2	591.747	27.97%	165.5
Copper	83.0	12.2	1008.45	27.97%	282.1
Cobalt	4.8	40.0	192	27.97%	53.7
Palladium	0.0	41,297.0	0	27.97%	0.0
Lithium	6.0	9.1	54.6	27.97%	15.3
Platinum	0.0	51,116.0	0	27.97%	0.0
TOTAL					516.6

EV TYPE: HEV					
	Step 1	Step 2		Step 3	
	Metal Weight in Kg	Price per Metal in Kg	Metal Intensity	EV Contribution to total EV production	Weighted Metal Intensity (Metal Intensity x Contribution)
Nickel	1.0	15.2	14.8	53.99%	8.0
Copper	40.0	12.2	486.0	53.99%	262.4
Cobalt	0.1	40.0	4.8	53.99%	2.6
Palladium	0.0	41,297.0	107.4	53.99%	58.0
Lithium	0.2	9.1	1.4	53.99%	0.7
Platinum	0.0	51,116.0	15.3	53.99%	8.3
TOTAL					400.0

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EV TYPE: PHEV					
	Step 1	Step 2		Step 3	
	Metal Weight in Kg	Price per Metal in Kg	Metal Intensity	EV Contribution to total EV production	Weighted Metal Intensity (Metal Intensity x Contribution)
Nickel	9.8	15.2	147.9	18.01%	26.6
Copper	60.0	12.2	729.0	18.01%	131.3
Cobalt	1.2	40.0	48.0	18.01%	8.6
Palladium	0.0	41,297.0	107.4	18.01%	19.3
Lithium	1.5	9.1	13.7	18.01%	2.5
Platinum	0.0	51,116.0	15.3	18.01%	2.8
TOTAL					191.1

Source: Truflation

EV TYPE: FCEV					
	Step 1	Step 2		Step 3	
	Metal Weight in Kg	Price per Metal in Kg	Metal Intensity	EV Contribution to total EV production	Weighted Metal Intensity (Metal Intensity x Contribution)
Nickel	0.98	15.2	14.8	0.03%	0.0
Copper	83.0	12.2	1008.5	0.03%	0.3
Cobalt	0.1	40.0	4.8	0.03%	0.0
Palladium	0.0	41,297.0	0.0	0.03%	0.0
Lithium	0.2	9.1	1.4	0.03%	0.0
Platinum	0.0	51,116.0	2044.6	0.03%	0.6
TOTAL					0.9

This metal intensity multiplied by the contribution of each EV type to provide a weighted Metal Intensity that reflects the price of EV commodities in its real world contribution to total EV manufacturing.

Step 4: Aggregation to the EV Metal Index

The weighted metal intensity of each metal type is calculated for each EV type and then aggregated to derive the total weighted metal intensity across all EV manufacturing.

This total weighted metal intensity represents the metal input cost required to produce an average EV. The Total EV Index is subsequently calculated by summing these weighted metal intensities.

Exhibit 6: The Total EV Weighted Metal Weighting for the Index

	Final Total EV Weighting by Metal Type
Nickel	11.91%
Copper	84.78%
Cobalt	1.47%
Palladium	0.00%
Lithium	1.83%
Platinum	0.00%
TOTAL	100.00%

Index Calculation Framework

To ensure accuracy while maintaining consistency and usability, each component of the calculation is updated annually:

- **Metal weights across the four primary EV types (BEVs, HEVs, PHEVs, and FCEVs):** Updated annually by the end of February and then entered into the calculation on March 1.
- **Metal prices per kilogram:** Price data for nickel, copper, cobalt, lithium, platinum, and palladium are updated daily.
- **EV vehicle production volumes:** Updated annually by the end of February and then is updated in the calculation on March 1.

By integrating metal intensity and market share, the methodology ensures that the index accurately reflects material usage patterns and economic significance across the EV value chain.

This approach enables the TruEV Index to deliver a nuanced and representative measure of each metal's importance in EV production, effectively combining physical demand with price sensitivity.

Rebalancing Frequency
The Index is rebalanced annually in order to reflect changes in the production shares and metals intensity per EV type. No constituent additions or removals are made as part of the annual rebalance; only weights are adjusted in accordance with changes in market size.

Scaling Factor (Divisor Adjustment)
A scaling factor is applied to maintain index continuity and prevent artificial changes in the index level resulting from structural events. Structural events include constituent additions or deletions, changes in index weights due to scheduled rebalancing, and other methodology-driven adjustments.

The scaling factor is calculated as:
Scaling Factor = Old Weighted Sum / New Weighted Sum

The index level is calculated as:
Index Level = Weighted Sum × Scaling Factor

Prior to a structural event, the scaling factor remains unchanged. On the effective date of a constituent change or weight rebalance, the scaling factor is recalculated so that the index level immediately before and after the event remains consistent. The recalculated scaling factor remains in effect until the next structural event requiring adjustment.

All scaling factor changes are documented with effective dates to ensure transparency, auditability, and historical consistency of the index series.

Historical Production shares

Historical weights are maintained and published in tabular form (Exhibit 7) to ensure transparency and enable longitudinal analysis of structural shifts within the EV commodity ecosystem.

Exhibit 7 - Historical Production shares

Date	BEV	HEV	PHEV	FCEV
January 1, 2018	17.88%	73.61%	8.30%	0.21%
January 1, 2019	19.06%	73.36%	7.37%	0.21%
January 1, 2020	22.07%	66.96%	10.71%	0.26%
January 1, 2021	33.49%	52.32%	13.83%	0.36%
January 1, 2022	40.98%	42.31%	16.28%	0.43%
January 1, 2023	37.29%	46.99%	15.66%	0.06%
January 1, 2024	27.97%	53.99%	18.01%	0.03%

5. The Data Sources

Commodity Pricing

Commodity prices are sourced from the global commodity pricing organizations to ensure accuracy, consistency, and market integrity.

EV Production and Market Data

EV production data is derived from a diversified and evolving set of industry-leading sources, ensuring comprehensive market coverage. Core contributors include:

- ***EV Volumes and Daily Metal Prices:*** SNE Research, Hybrid Vehicles Market, IMARC and the International Energy Agency (IEA)
- ***Manufacturer Data:*** Direct inputs from Hybrid Electric Vehicle (HEV) and Fuel Cell Electric Vehicle (FCEV) manufacturers
- ***Market Analytics Firms:*** Spherical Insights, Grand View Research, Fortune Business Insights, Coherent Market Insights, and Mordor Intelligence.

These sources provide data on units produced and sold, market penetration, used to calculate market share of each EV type, which are all critical for accurate index calibration.

Metal Usage and Material Intensity Data
Metal usage data is incorporated to reflect the actual consumption of materials in the EV production. Data is sourced from specialized institutions and industry experts, including:

- *Automotive Industry Data:* LMC Automotive (vehicle production volumes) influencing the estimated metal usage in EV manufacturing.
- *Metal Institutes:* Nickel Institute and Copper Institute which offers targeted data on the usage of these metals in EV components.
- *Energy and Commodity Authorities*: London Bullion Market Association (LBMA), U.S. Department of Energy, International Energy Agency (IEA) who contribute essential information on trading, energy consumption and material use relevant to EV production.
- **Market Intelligence:** GlobalData that provides broader industry trends and projections that affect metal demand.

This layered and adaptive methodology ensures that the TruEV Index remains robust, transparent, and representative of real-world EV production dynamics. By integrating production volumes, material intensity, and commodity pricing, the index delivers a comprehensive and forward-looking view of the metals that underpin the global transition to electric mobility.

6. The Output Metrics

The Truflation EV Commodities Index is updated on a daily basis at 23:59 UTC, and produces the following indexes:

1. Truflation EV Commodities Headline Index in USD
2. Truflation EV Commodities Headline year on year percentage change
3. Truflation EV Commodities Constituents price in USD
4. Truflation EV Commodities Constituents year on year percentage change
5. Truflation EV type Index in USD
6. Truflation EV type year on year percentage change
7. Historical time series

The TruEV Index was officially launched on December 13, 2023, with historical data starting from January 1, 2018.

7. Compliance and Governance

The compliance and governance framework of the TruEV Index defines the regulatory alignment, ethical standards, and oversight mechanisms that ensure the Index operates with integrity, transparency, and in accordance with industry best practices.

Compliance with Standards
The Truflation EV Commodity Index methodology is designed to align with internationally recognized standards for financial benchmarks. This includes adherence to the principles established by the International Organization of Securities Commissions (IOSCO), which address key areas such as data sufficiency, transparency, accountability, governance, and auditability. Alignment with these principles supports the index's credibility and suitability for institutional use.

Mitigation of Market Volatility Risk
Given the inherent volatility of commodity markets, the EV Commodity Index incorporates multiple risk-mitigation mechanisms to preserve stability, reliability, and analytical value.

- Diversification
    - Broad Commodity Exposure: The index includes a diversified basket of key EV-related commodities; nickel, cobalt, copper, palladium, platinum and lithium, reducing reliance on any single price driver.
    - Industry Representation: Each included commodity plays a critical role in EV production, ensuring diversification remains economically relevant.
- Dynamic Weighting
    - Recalibration: Commodity weights are recalibrated to reflect updated market conditions, production dynamics, and price movements.
    - Risk Balancing: Dynamic weighting helps moderate the impact of highly volatile commodities, supporting index stability while maintaining market relevance.
- Continuous Monitoring and Reassessment
    - Ongoing Market Surveillance: Commodity prices, EV production trends, and industry developments are monitored continuously to identify emerging risks.
    - Methodology Review: Periodic reviews ensure the methodology remains aligned with current market structures and technological advancements.

- Adaptive Adjustments: Where material market shifts occur, controlled and transparent methodology updates may be implemented to preserve index accuracy.

Through a comprehensive governance structure, independent oversight, immutable methodology, and robust risk-mitigation mechanisms, the TruEV Index is designed to function as a resilient, transparent, and trusted benchmark. These controls collectively ensure that the index remains a reliable tool for stakeholders navigating the complex and rapidly evolving EV commodity market.

8. Truflation EV Commodities Index Benefits

The Truflation EV Commodities Index offers a range of benefits for investors, analysts, manufacturers, and policymakers seeking clear insight into the material foundations of the electric vehicle market.

- ***Direct Exposure to EV Supply Chain Dynamics:*** The index provides targeted exposure to the key commodities that underpin electric vehicle production, linking EV manufacturing trends directly to the raw materials that enable batteries, drivetrains, and fuel cells. This creates a clear view into the upstream drivers of the EV transition.
- ***Production Driven, Fundamentals Based Weighting:*** Weights are derived from real-world EV production data, metal intensity per vehicle, and market prices. This ensures the index reflects actual material usage rather than purely financial market capitalization or subjective assumptions.
- ***Transparent & Adaptive Methodology:*** The rebalancing allows for the index to adjust to changes in technology production mix and commodity pricing. As the EV adoption pattern evolves, the index remains aligned with current market realities. This approach operates under a clearly defined, publicly documented methodology with no discretionary adjustments. The transparency supports trust and institutional adoption.
- ***Insights into cost pressures and inflation trends:*** By tracking the price movements of EV-related commodities, the index provides valuable insight into input-cost inflation faced by EV manufacturers and supply-chain participants.
- ***Reliable Market Benchmark:*** The Truflation EV Commodities Index serves as a credible benchmark for performance evaluation, research, and comparative analysis across EV-related investment strategies and products.

The Truflation EV Commodities Index delivers a transparent, production-linked, and diversified view of the materials driving electric mobility, making it a powerful tool for understanding, tracking, and participating in the EV transformation.

9. Summary

The Truflation EV Commodities Index is an institutional-grade benchmark designed to track the key raw materials that underpin global electric vehicle (EV) production. The index links real-world EV manufacturing data with the commodities essential to batteries, electric drivetrains, and fuel cell technologies, providing a transparent and production-driven view of the EV supply chain.

The index includes a diversified basket of EV-critical metals; lithium, nickel, copper, cobalt, palladium, and platinum which have been selected for their fundamental roles in EV manufacturing. Weightings are determined using a rules-based methodology that integrates metal intensity per vehicle, EV production market share across vehicle types, and prevailing commodity prices. Weights are recalibrated annually to ensure continued alignment with evolving technology, production trends, and market conditions.

The TruEV index serves as a reliable benchmark for monitoring input-cost dynamics, managing commodity exposure, and analyzing the material drivers of the global transition to electric mobility. It provides a clear, adaptive, and objective measure of the commodities powering the electric vehicle revolution, offering valuable insight for investors, manufacturers, analysts, and policymakers alike.

10. Version History

Version	Date Released	Notes
1.0	December 13, 2023	Genesis of the Truflation EV Commodities Index
1.1	April 12, 2024	Lithium addition
1.2	October 9, 2024	Removed Base data paragraph
1.3	April 15, 2025	Added Historical weights data
1.4	July 15, 2025	Rebalance Update: July 2025
1.41	October 13, 2025	Rebalance Update: October 2025
2.0	February 5, 2026	Calculation update and annual update of production shares & Metals Intensity