ABSTRACT:
With the constant rise in the number of electric vehicles, we need a widespread charging infrastructure which supports seamless charging and billing. One of the very prominent problems existing with commonly used billing systems is: lack of transparency, where the service provider can overcharge the customer, or if the service provider not following the trade rules defined by the government. We propose an infrastructure using blockchain, which provides a verifiable, transparent and compliant billing for electric vehicle charging.

CHALLENGES:
• Integrity of dynamic tariff based billing
• Ensure efficient distribution of energy
• Seamless charging experience
• Scalable infrastructure
• Privacy of a user data

KEY INGREDIENTS:
• Micro-payments used for energy trading
• Smart contracts generating the bills.
• Dynamic tariff based billing
• Trade possible only if compliant with the government regulated policies
• Hyperledger Fabric as the blockchain backbone

TRADING ENTITIES:
• User - Charging Station
• Charging Station - Grid
• Charging Station - Local Power Generation

ROLES (TRADING ENTITIES):
• Consumer
• Re-seller
• Producer

MODE OF OPERATION (MoO):
• Local generation
• Grid generation

FLOW OF ENERGY

Authentication & authorization → Set Point validation → Bill generation → Blockchain → Micro-payments → Charging

SEQUENCE OF STEPS

Transaction Id #123
{ MoO: Grid Load: Time Stamp: Current Tariff: Charge: ChargingTime ............ }

TRANSACTION

FURTHER DIRECTIONS:
• Grid Load balancing
• Vehicle to vehicle electricity trading
• Battery refuelling and swapping