

Figure 1: EV Client Identifier/Cloud Registration

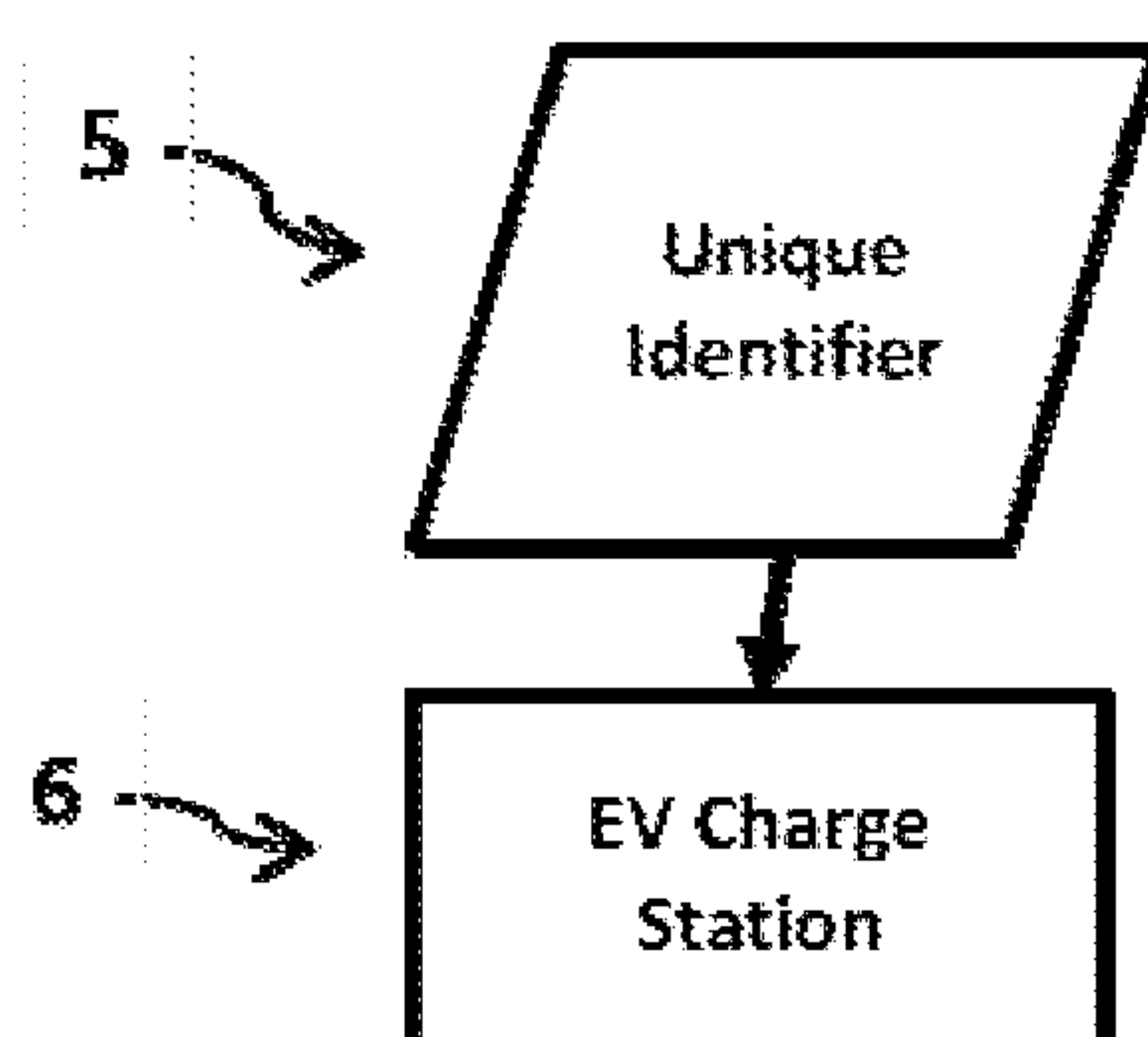


Figure 2: EV Charge Station Identifier

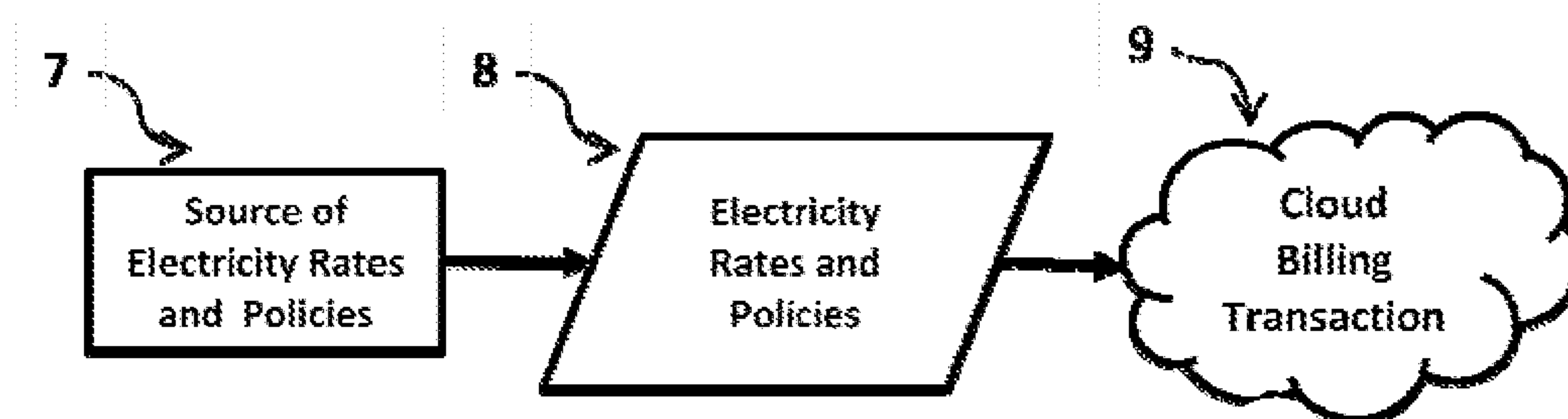


Figure 3: Electricity Rates and Policy Update Process

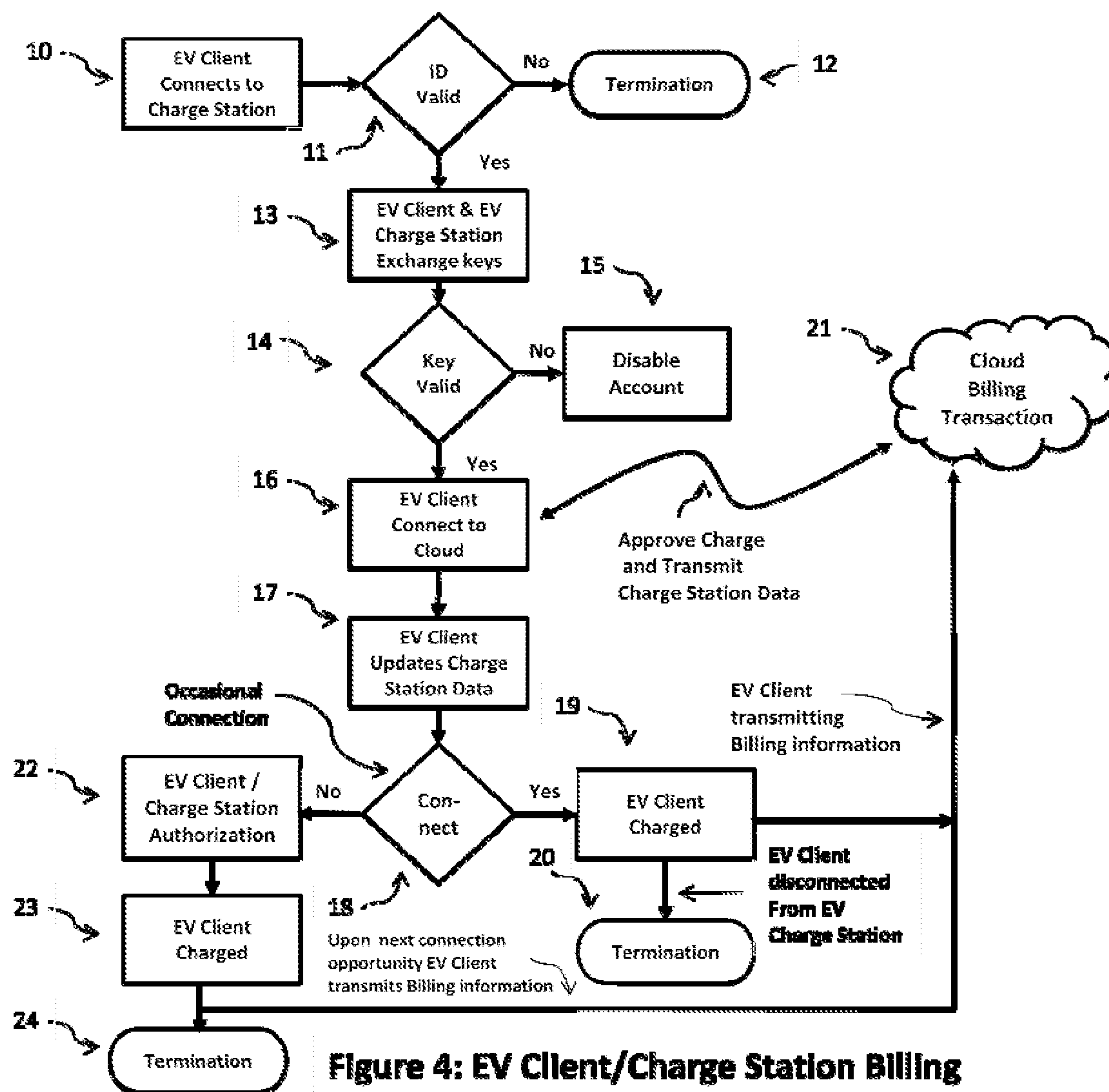


Figure 4: EV Client/Charge Station Billing

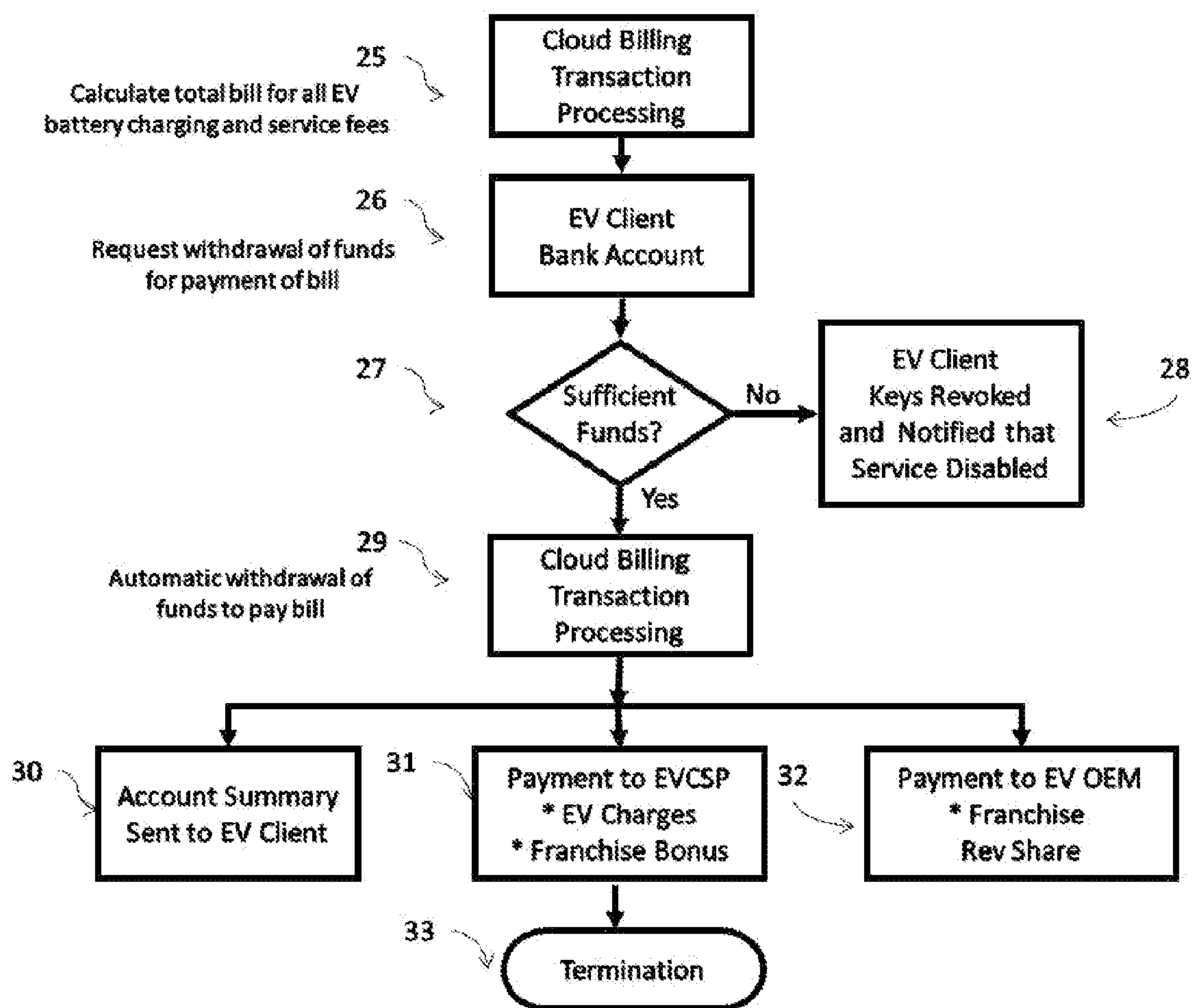


Figure 5: Cloud Billing Process

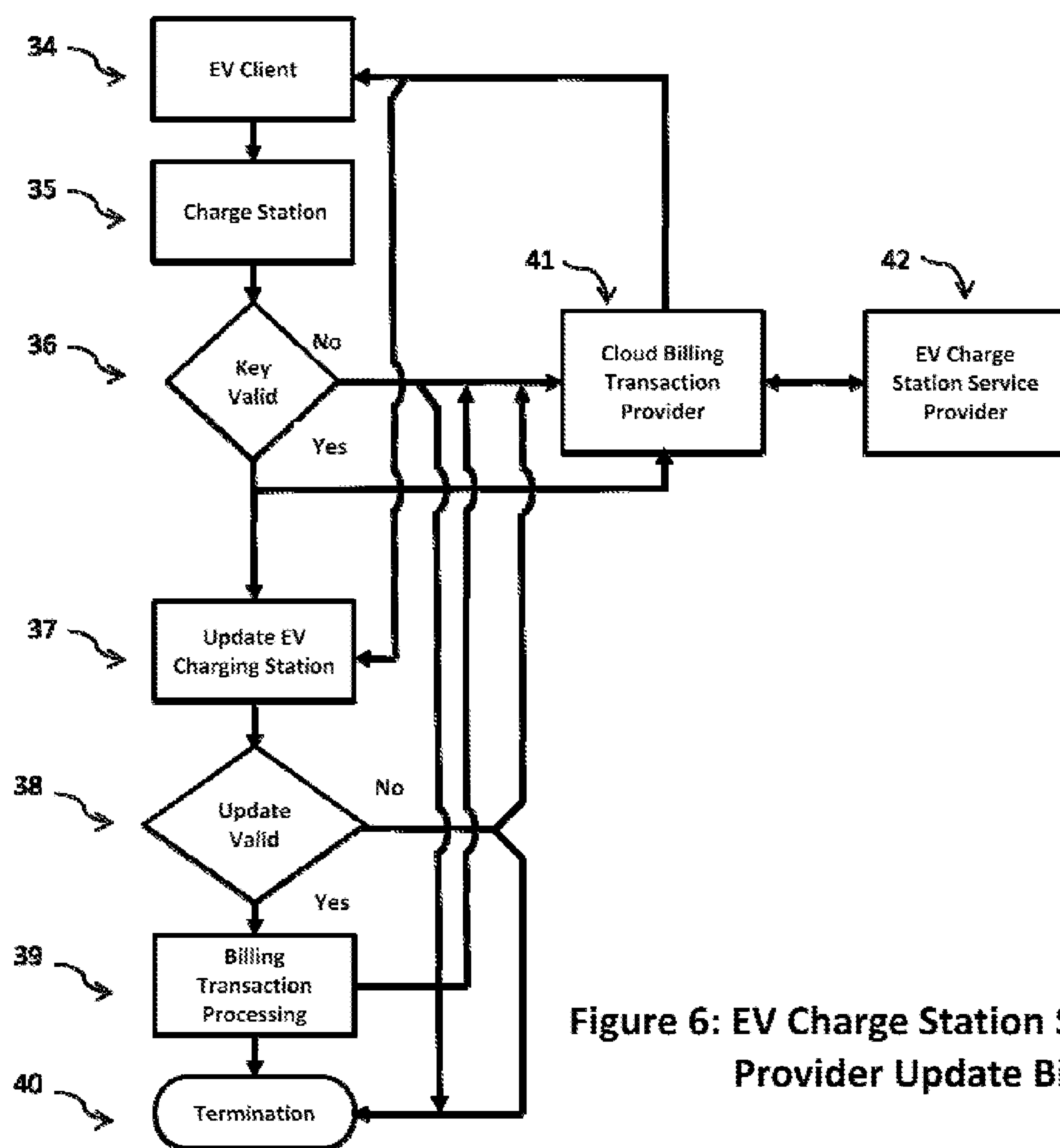


Figure 6: EV Charge Station Service Provider Update Billing

METHOD AND PROCESS OF BILLING FOR GOODS LEVERAGING A SINGLE CONNECTION ACTION

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefited of our earlier filed provisional application titled: Method and process of administrating recharging of electric vehicles using low cost charge stations filed on Oct. 9, 2009 and filed provisional application titled: Method and Process of billing for goods leveraging a single connection action filed on Oct. 9, 2009.

FIELD OF THE INVENTION

[0002] The present invention relates to a single-action fully automated method and system for placing an order and delivering goods leveraging pre-arranged agreements over the Internet (or other networks) and enabling multiple parties to share in the revenues generated from the sales of said goods.

BACKGROUND OF THE INVENTION

[0003] The rising cost of hydrocarbon based fuels and environmental factors will require a massive transformation of society's transportation infrastructure from fossil fuel to electricity as the primary means of powering vehicles. As electrical vehicles (EV) enter mass production a new infrastructure that consists of numerous, conveniently located electrical charging stations will be required such that drivers can reliably re-charge their EV's batteries while away from home. Furthermore, EV battery charging technology that is simple to use (i.e. does not require human supervision nor the use of cash, credit cards, debit cards, and/or digital "smart" cards) and least costly to manufacture, install, and maintain (because it is not burdened with network communications technologies) is most likely to achieve wide-spread adoption. Such charging stations will enable the EV driver to experience the same ease of re-charging their EV remotely that they experience while re-charging at home, with the convenience of having the electricity cost for all EV re-charging (whether done at home or away from home) charged to a credit account, consolidated onto the regular monthly invoice, or automatically deducted from a bank account of their choice. The introduction of EV charging technology will require inherent business risks on the part of the manufacturers of EVs and the owner operators of EV charging facilities. Because of these risks, the EV charging technology which offers such entities the opportunity to establish a business "franchise" based on fees associated with EV charging events is most likely to be adopted. The combined attraction of such EV charging technology for EV owners (for convenience), EV charge service providers (for the for the cost of ownership of the charging technology) and EV Manufacturers and EV charge service providers (for the business value offered by the "franchise") would create the greatest likelihood for accelerated adoption of this technology in the market.

SUMMARY OF THE INVENTION

[0004] The objective of this invention is to provide a method that in response to a Single Action Event; initiates, establishes, and completes an end-to-end transaction based solution for charging Electric Vehicles via networked connected infrastructure.

[0005] The Single Action Event occurs when an Electric Vehicle is coupled to an Electric Vehicle Charging Station. This coupling initiates an automated sequence of events that encompasses consumer and charging service provider identification and authorization, utility company electricity rates and policy, cost assessment of services rendered, method of payment via electronic billing transaction, and distribution of billing fees across interested parties such as Electric Vehicle Manufacturers and Charging Station Service Providers etc.

[0006] Consumer and charging service provider identification and authorization collateral is determined via prearranged agreements. Said agreements and contracts are individually established between interested parties where identification and authorization data is collected, secured, and is used in the end-to-end Electric Vehicle charging transaction based solution.

[0007] Utility Company electricity rates and policy are dynamically accessed and implemented "real-time" to calculate and determine the exact electricity rates and policy during the active charge cycle for billing fee determination.

[0008] Method of payment via electronic billing transaction, and distribution of billing fees across interested parties such as Electric Vehicle Manufacturers and Charging Station Service Providers etc is predetermined via agreements. When the Electric Vehicle charging cycle terminates billing information and fees are registered and interested parties accounts are modulated accordingly

[0009] The Single Action Event is not limited to having an internet and/or network connection at the immediate time the Electric Vehicle connects to an Electric Charging Station having charging services rendered. Intelligence is comprehended and built-in to "store and forward" relevant information when a network connection is eventually established. This store and forward capability establish a uniqueness that allows the Electric Vehicle Charge Stations to be placed in locations where a network connection may not be feasible thus allowing the Electric Vehicle to "Roam" and attaining a charge anywhere there is a Utility Company service available, i.e. power lines

[0010] In summary, the invention provides a method that on a Single Action Event establishes an end-to-end infrastructure and billing environment that seamlessly allows Electric Vehicles and consumers to charge vehicles without complexity and enables Electric Vehicle "roaming" flexibility

[0011] In other aspects, the invention provides a system and method having features and advantages corresponding to those discussed above

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

[0013] FIG. 1 Shows a flow chart outlining unique identifier of the client to the billing system.

[0014] FIG. 2 Shows a flow of a unique identifier associated with the EV Charging Station.

[0015] FIG. 3 Shows a flow chart which associates the rate schedule for power to the billing system.

[0016] FIG. 4 Shows a flow chart detailing the process of associating the Client ID with the Charge Station and sending the charge amount to the Billing System.

[0017] FIG. 5 Shows a flow chart detailing the process of calculating the Charging Station bill and recovering payment from the Client.

[0018] FIG. 6 Shows a flow chart detailing updating the Charge Station with updated billing information.

DETAILED DESCRIPTION

[0019] The present invention provides a method and system for a single-action ordering method based on pre-arranged agreements between the electric vehicle owner and service provider (electric power utility and/or third party charging service) to charge the vehicle leveraging integrated client and Internet server environment. The single action is the connection of the electrical vehicle (EV) to a charging station. The single-action ordering system of the present invention reduces the number of purchaser interactions needed to place an order and reduces the amount of sensitive information that is transmitted between a vehicle client system and an Internet server authentication system. In one embodiment, the vehicle client is assigned a unique vehicle client identifier and is unique to each vehicle client system. The server system also stores purchaser-specific and vendor-specific billing information which is used for remote billing for services rendered. The server system maps each client identifier to a purchaser which is mapped to the billing account. Along with the order information, a unique identifier of the vendor is also sent so to the billing server so the client is mapped to the vendor and the vendor's electricity rates and policies in order to process billing.

[0020] The single action ordering method is initially enabled when a consumer purchases an EV vehicle. The EV vehicle, when consumer owned, is referred to as the EV Client in the following figures.

[0021] Referring to FIG. 1 (EV Client Identifier/Cloud Registration), shows the EV Client being assigned a unique identifier. The unique identifier 1 can be assigned to the EV Client 2 prior or post delivery to the consumer. A Public/Private Key pair is also assigned to the EV Client. Upon consumer EV Client ownership, the EV Client unique identification and relevant consumer billing information are registered, 3, with a billing transaction service provider 4.

[0022] Referring to FIG. 2 (EV Charge Station Identifier), shows a relative unique identifier 5 being assigned to an EV Charge Station 6. This unique identifier is utilized when the EV Client is connected to the EV Charge Station and is used during the billing transaction process as shown in FIG. 3 (EV Client/Charge Station Billing). A Public/Private Key pair is also assigned to the EV Charge Station during this step (FIG. 2 (A)).

[0023] Referring to FIG. 3 (Electricity Rates and Policies Update Process), shows the process through which a source of electricity rates and policies 7, such as an electric power utility, an EV Charge Service Provider (EVCSP), or other entities transmit current electricity rates and policies 8 to the Cloud Billing Transaction Service 9. The rates component of the Electricity Rates and Policies 8 can be static price schedules (such as fixed rates or time-of-use schedules) which are transmitted infrequently, i.e. only when these schedules change. Rates might also include dynamic price signals (such as critical peak pricing) which are only transmitted for specific days and timeframes, for example, when the electric utility is experiencing an excessive demand for electricity. Pricing policies might include any number of policies which might be applied according to local government regulations,

for example, restricting the amount of charge that might be provided during critical peak periods.

[0024] Referring to FIG. 4 (EV Client/Charge Station Billing), shows the process for authenticating the EV client prior to charging the EV and enabling the charging transaction to occur. The EV Client is connected to the EV Charge Station 10. The EV client checks for the charging station ID to determine if it is compliant with the invention 11. If the charging station is not compliant to the single-action ordering system of the present invention (for example, if charging in the EV owner's home) then the EV billing module is not engaged and the billing process is terminated 12 and charging of the EV client can resume. If the charging station is compliant a connection is achieved and both units exchange public key information 13 and initiate a validation procedure 14. If key validation process fails the EV Client transaction is disconnected from the EV Charge Station, the EV Client account is disabled, and all processing is terminated 15. If the key validation process is successful 14 a connection between the EV Client and the billing transaction service provider is established 16 to update and exchange electricity consumption related information such as charge station ID, kilowatts consumed, current policy and rates, etc. The EV client in turn updates the stored rates and policy information (previously stored in the Cloud Billing Transaction Service as described above in FIG. 3) in the charging station 17. The EV Client checks to see if it still has a connection to the billing transaction service provider 18. If it does the EV Client battery is charged 19. Upon charge completion the EV Client disconnects from the EV charge station 20 and communicates all data relevant to assessing fees for service rendered to a billing transaction service provider 21. Should the EV client and the billing transaction service provider lose their connection, the EV client continues to reestablish its connection until all billing data is transmitted. Upon services rendered the EV Client is disconnected from the EV Charge Station, 18.

[0025] Instances may arise where a connection to a billing transaction service provider cannot be initiated (referred to as an "Occasional" connection) or fully maintained through completion during a real time EV Client/EV Charge Station exchange 18. In such cases the EV Client and EV Charge station will authorize charging services up to a predetermined credit limit 22 and the EV Client will be charged 23. All associated data and billing information will be cached within the EV Client and the Charge Station. Upon next connection availability, the EV Client 23 will transmit the cached data to a billing transaction service provider 21 and the process will be terminated 24. Additionally any successful future Charge Station connection with the billing system will cause the cache to be transmitted for transaction billing.

[0026] Referring to FIG. 5 (Cloud Billing Process), outlines the process for billing an EV Client for service rendered and making "franchise" payments to the EV Charge Station and EV OEMs. The Cloud Billing Transaction service 25 calculates the total bill for all EV Client billing for a given period of time. The bill includes battery charging services and processing fees. (The terms for billing period and processing fees are established with the EV Client upon ownership of the vehicle.) At the pre-arranged billing period the Cloud Billing Transaction service attempts to automatically withdraw the calculate fees from the EV Client bank account 26. Note that this withdrawal can be sourced from any type account, i.e. not limited to a bank account, e.g. an account established with the Billing Transaction Provider or any other mutually agreed to

source. The EV Client bank **27** determines if there are sufficient funds to make payment. In the event of insufficient funds to make payment and an alternate payment method is not available (such as a credit card) the Cloud Billing Service revokes the Public Keys and or unique identifier of the EV Client and the EV Client is notified that service is disqualified **28**. If there are sufficient funds **29** the Cloud Billing Transaction service withdraws funds from the EV Client Bank account then issues a billing statement **30** to the EV Client, issues payment to the EV Charge Station Service Provider (EV CSP) **31**, and issues a payment to the EV OEM (Original Equipment Manufacturer) **32**. The payments to the EV CSP and EV OEM include Franchise revenue sharing payments that are calculated as a percentage of the battery charging transaction value or per event transaction fees as defined by pre-arranged agreements between all associated parties.

[**0027**] FIGS. **1**, **2**, **3** and **4** show a method of which the customer places an order and receives services rendered; a complete service is transacted by the single action of connecting the charging station to an electrical vehicle. The action of physical connection (single action) starts an end-to-end sequence of events that bills the vehicle owner for the charging event, remits payment for services rendered to the EV CSP as well as franchise payment to the EV OEM and EV CSP. Termination of the event is as simple as fully charging the EV batteries or un-plugging the vehicle. Billing is routed automatically to the owner's account via a pre-arranged agreement with the billing transaction provider.

[**0028**] Referring to FIG. **6** (EV Charge Station Service Provider Update Billing), illustrates the process of direct billing a EV Charge Station Service Provider for a local EV Charge Station update. The EV Charge Station can be updated for example with information such as refreshed keys or polled for maintenance statistics or any other related information. The EV Client **34** is connected to the EV Charge Station **35**. When connection is achieved using public key encryption, **36** a validation procedure is initiated. If validation fails the connection is terminated **40**. Upon validation, the EV Client sends notification to the Cloud Billing Transaction Provider **41** which in turn notifies the specific EV Charge Station Service Provider **42** that an update can occur. The EV Charge Station Service Provider can then send update collateral to the EV Client **34** via the Cloud Billing Transaction Provider link and the EV Charge Station is updated **37**. Upon EV Charge Station update complete validation **38** Billing Transaction data processing occurs and the EV Client sends billing information **39** to the Cloud Billing Transaction Provider **41** and notification to the EV Charge Station Service Provider **42** via the Cloud Billing Transaction Provider **41** with acknowledgement. Also upon EV Charge Station update complete validation **38** the EV Client to EV Charge Station connection is terminated **40**. In the event of failure of the EV Charge Station update complete validation **38** the EV Charge Station Service Provider is notified and Termination **40** occurs. Upon successful update the EV Client **39** notifies the Cloud Billing Transaction Provider **41** that billing the local EV Charge Station Service Provider **42** for the update transaction can occur and the process is terminated **40**.

1. A method of placing an order for an item comprising:
 - a. Under control of a client system, in response to a single-action being performed, sending a request to order an electric vehicle charge event along with a unique identifier of the vehicle owner in combination with the con-

nected charging service Vendor ID and vendor's unit unique public key to the server system.

- b. Under control of the connected charging service vendor system, in response to a single-action being performed, sending its unique Vendor ID, prevailing electricity rates, billing policies, and public key to the server system via the connection enabled by the electric vehicle
 - c. Under the control of a single-action ordering component of the server system receiving the request; retrieving additional information previously stored for the purchaser identified by the identifier in the received request in combination with the unique identifier of the charging service vendor and public key; generating a secure authentication message to start the electric vehicle charge event to the charge station and transmitting billing related information to the charge station as needed via the connection to the electric vehicle.
2. The method of claim **1** wherein the single-action is connecting the charging station to the electrical vehicle.
3. The method of claim **1** wherein a user of the client system does not need to explicitly identify themselves when connection the electric vehicle.
4. A client system for ordering an item comprising:
 - a. an identifier that identifies a customer;
 - b. a single-action ordering component that in response to performance of only a single-action, sends a request to a server system to order an electric vehicle charge event and vendor ID so that the server system can locate additional information needed to complete the order and so that the server system can fulfill the generated order to complete purchase of the charge event.
5. The client system of claim **4** wherein the predefined single-action is the connecting of the charging station to the electrical vehicle.
6. A server system for generating an order comprising:
 - a. a data storage medium storing information for a plurality of users;
 - b. a receiving component for receiving requests to order an electric vehicle charge event, a request including an indication of one of the plurality of users, the request being sent in response to only a single action being performed; and
 - c. an order placement component that retrieves from the data storage medium information for the indicated electric vehicle owner and electric vehicle charge service provider and that uses the retrieved information to place an order for the indicated user for the item; and
 - d. an order fulfillment component that completes a purchase of the charge event in accordance with the order placed by the single-action ordering component which specifies amount of electricity consumed as well as prevailing rates and billing policies.
7. The server system of claim **6** wherein the request is sent by a client system in response to a single-action (connecting the electric vehicle to the charging station) is performed.
8. A method for ordering an item using a client system, the method comprising:
 - a. displaying information identifying the state of electric vehicle battery charge and electricity rates and policy information and displaying an indication of a single-action that is to be performed to order a charge event (connecting the electric vehicle to the charging station); and

b. in response to only the indicated single-action being performed, sending to a server system a request to order an electric vehicle charge event

c. whereby authentication is sent to the vendor to fulfill the order to complete a purchase of the item.

9. The method of claim 8 wherein the server system uses a client identifier sent along with the request to identify additional information needed to generate an authentication for the electric vehicle charge event.

10. The method of claim 8 wherein the server system uses a vendor identifier database identifies the charging services vendor system.

11. The method of claim 8 wherein the client system and server system communicate via the Internet or any network communication link.

12. The method of claim 8 including the act of sending from the server system to the client system a confirmation that the order was generated.

13. The method of claim 8 including the act of sending from the client system to the vendor charging station system a confirmation that the order was generated.

14. The method of claim 8 including the act of sending from the server system to the client system a packet of data that enables the update of software and/or data, as well as electricity rate and policy data, electronically stored on the vendor charging station.

15. The method of claim 8 including the act of sending from the client system to the vendor charging station a packet of data that enables the update of software and/or data, as well as electricity rate and policy data, electronically stored on the vendor charging station.

16. The method of claim 8 wherein the single-action is connecting the charging station to the electrical vehicle.

17. A client system for transmitting billing information related to fulfillment of a fulfilled electric vehicle charging order comprising:

a. an identifier that identifies a customer (electric vehicle owner);

b. a single-action ordering component that in response to a sequence of events initiated by a single-action sends a packet of billing information (including customer identifier, charging station vendor identifier, and data related to the electric vehicle charging event) to a server system to implement billing of the customer for the charge event.

18. The method of claim 17 wherein the predefined single-action is connecting the electric vehicle to the charging station and the sequence of events initiated by this single-action is the complete charging of the electric vehicle's batteries or the disconnection of the electric vehicle from the charging station.

19. The method of claim 17 wherein the client system transmits a packet of billing information (including customer identifier, charging station vendor identifier, and data related to the electric vehicle charging event) to a server system to implement billing of the customer for the charge event.

20. The method of claim 17 wherein the client system recognizes if the communication link with the server system has been temporarily disconnected and continues to send the packet of billing information until the connection is restored and the packet is successfully transmitted to the to the server system

21. A server system for implementing billing of fulfilled electric vehicle charging orders comprising:

a. a data storage medium storing information for a plurality of electric vehicle owners, charging services vendors, EV manufacturers, and other affiliated organizations, including the unique affiliations that exists between manufacturers and owners of electric vehicles;

b. a receiving component for receiving electricity rate information (including static rates, time of use rate schedules, and dynamic price signals) and charging policy information (including any restrictions or conditions placed on charging events) from the source of this information (e.g. electric power utilities, electric charge service providers, and other entities).

c. a receiving component for receiving a billing information packet related to an electric vehicle charge event (including electric vehicle owner identifier, charging station vendor identifier, and data related to the electric vehicle charging event) being received in response to a sequence of events initiated by single-action being performed;

d. a billing fulfillment component that retrieves from the data storage medium information for the indicated electric vehicle owner and uses the retrieved information to calculate a service fee (as a percentage of the billing generated by the charging event and/or on a per transaction basis) automatically withdraw funds (equal to the billed value of the charging event plus the service fee) from a designated EV owner's account (or charge the EV owner's designated credit account) via a pre-arranged agreement, and

e. a franchise bonus fulfillment component that retrieves from the data storage medium information for affiliated organizations (the vendor of charging services, the manufacturer of the EV, and other organizations) and uses the retrieved information to calculate bonus payments (as a percentage of the above mentioned service fee) and disperse said "bonus" payments to these affiliated organizations (either immediately or accumulated and paid on a billing schedule as defined with these organizations). and

22. The method of claim 21 wherein the server system uses a client identifier sent along with the request to identify additional information needed to calculate billing for an electric vehicle charge event.

23. The method of claim 21 wherein the server system uses a vendor identifier database identifies the owner operator of the electric vehicle charging station (i.e. the charging service vendor) and/or the affiliated electric service utility that provides electric service to this vendor.

24. The method of claim 21 wherein the server system communicate via the Internet or any network communication link.

25. The method of claim 21 wherein the server system automatically withdraws funds (equal to the billed value of the charging event plus the service fee) from a designated EV owner's account (or charges the EV owner's designated credit account) via a pre-arranged agreement.

26. The method of claim 21 wherein the server system automatically disperses "bonus" payments to affiliated organizations (either immediately or accumulated and paid on a billing schedule as defined with these organizations).

27. The method of claim 21 including the act of sending from the server system to the client system a confirmation that

billing for the vehicle charging transaction has been completed.

28. The method of claim **21** including the act of sending from the server system to the vehicle charging services vendor, EV manufacturer, or other affiliated organizations a transaction record of the electric vehicle charging event for billing auditing purposes.

29. The method of claim **21** wherein the single-action is disconnecting the electrical vehicle from the charging station and the sequence of events initiated by this single-action is the complete charging of the electric vehicle's batteries or the disconnection of the electric vehicle from the charging station.

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