

EV Micro-Climate Plan for the State of Tennessee



The EV Project Implementation Plan

Version 3.0

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Acronym List

AC	Alternating Current
ARRA	American Reinvestment and Recovery Act
CCN	Certified Contractor Network
DC	Direct Current
DCFC	Direct Current Fast Charger
DOE	Department of Energy
DOT	Department of Transportation
EPRI	Electric Power Research Institute
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
kW	kilowatt
LOI	Letter of Intent
MPO	Metropolitan Planning Organization
ORNL	Oak Ridge National Laboratory
PHEV	Plug-in Electric Vehicle
RPA	Regional Planning Agency
SAE	Society of Automotive Engineers
SMART	Smart Model Area Recharge Terminal
SOC	State of Charge
TAZ	Traffic Analysis Zone
TVA	Tennessee Valley Authority
TVPPA	Tennessee Valley Public Power Association
U.S.	United States
VAC	Volts Alternating Current

1 Purpose

The purpose of this Electric Vehicle (EV) Micro-Climate document is to record the process used by The EV Project for distributing, locating, and selecting electric vehicle supply equipment (EVSE) sites. The input to this document is the work of the Long-Range EV Charging Infrastructure Plan for Tennessee.

This plan details the process for and outlines the continued importance of stakeholder engagement in the design and development process of The EV Project infrastructure. The EV Project is the largest deployment of EVs and electric vehicle infrastructure in the history of the United States (U.S.).

This document also provides a deliverable for the Department of Energy (DOE) contract for The EV Project and is a standard offering as part of ECOTality North America's (ECOTality) Micro-Climate planning process.

Tennessee is one of seven states to experience the electrification of the transportation industry through the DOE Vehicle Demonstration and Vehicle Infrastructure Evaluation (DE-FOA-0000028). Through a highly collaborative and interactive approach including policy makers, utilities, local and state government, grass roots organizations, the DOE, major employers, charge operators and leaders of industry, ECOTality implements the EV Micro-Climate in The EV Project to successfully deploy EV infrastructure for the purpose of creating a Lessons Learned report about EVs and EV charging infrastructure.

The ECOTality EV Micro-Climate™ is a process by which custom EV infrastructure results from the implementation of a standard process: a truly rich, highly functional and scalable EV charging infrastructure and growth strategy. This process involves a series of documents created together with a key stakeholder group that together comprise the framework from which the infrastructure develops. Continued stakeholder engagement ensures that the projects goals and objectives are met and provides opportunity to discuss the advantages and challenges of using electricity as a fuel for our vehicles.

The EV Micro-Climate™ program is an integrated turn-key program that advances select areas for the adoption of electric transportation. Beginning with extensive feasibility and infrastructure planning studies, the program provides a blueprint for a comprehensive EV infrastructure system and provides detailed action plans for its successful execution and continued maintenance.

2 National Scope

On August 5, 2009, ECotality, a subsidiary of ECotality, Inc. (NASDAQ:ECTY) was awarded a \$99.8 million grant from the U.S. DOE. This grant made possible The EV Project, which was launched on October 1, 2009.



Nissan LEAF



Chevrolet VOLT

On June 16, 2010, The EV Project was expanded to include the cities of Los Angeles, California and Washington, D.C. The EV Project was granted an additional \$15 million by the DOE. With the partner match, the total value of the project is now approximately \$230 million.

The EV Project will deploy nearly 15,000 EVSE charging stations in 16 cities located in six states (Oregon, Washington, California, Arizona, Tennessee and Texas) and the District of Columbia. Nissan North American and General Motors/Chevrolet are partners in The EV Project. The EV Project will provide participant drivers of the Nissan LEAF zero-emissions electric car and the Chevrolet Volt plug-in hybrid (PHEV) with extended range a residential charger at no cost and installation credit which will support most, if not all of the costs of installation, as long as qualifications are met. In exchange for this, the participants will agree to allow data to be collected on their vehicle and charging equipment to support the lessons learned phase of The EV Project.

The EV Project will collect and analyze data to characterize vehicle use in diverse topographic and climatic conditions, evaluate the effectiveness of charge infrastructure, and conduct trials of various revenue systems for commercial and public charge infrastructure. The ultimate goal of The EV Project is to take the lessons learned from the deployment of these first 8,300 EVs, and the charging infrastructure supporting them, to enable the streamlined deployment of the next 5,000,000 EVs.

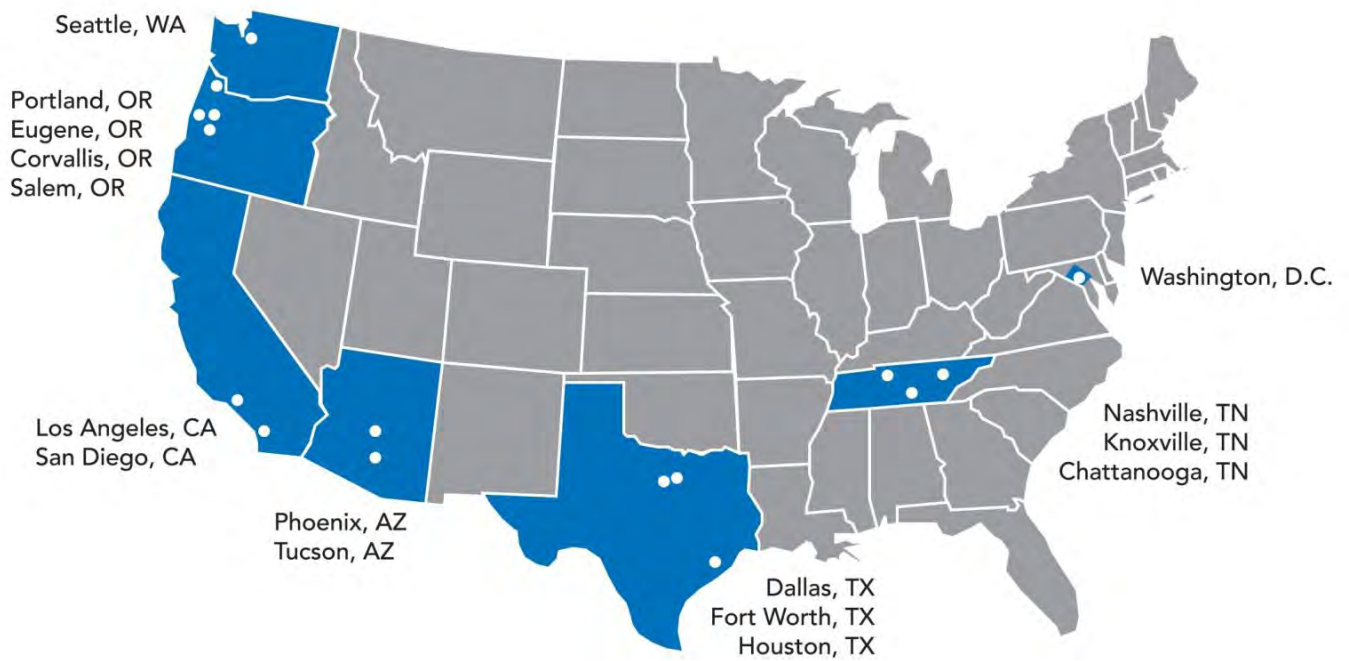


Figure 1. EV Project Area Map

3 Electric Vehicle Charging Station Technology

3.1 Standard Level 2 EVSE Connector

For wide spread EV adoption to occur, a standard for connecting the vehicle to the electric grid was required. The Society of Automotive Engineers (SAE) standardized the connector for Level 2 charging as the J1772, as shown in Figure 2.



Figure 2. Standardized EV Charging Connector – J1772



Figure 3. EV Charging Equipment with Standard Connector

3.2 AC Level 2

EVSEs that use the standardized J1772 connector provide an alternating current (AC) charge. An EV owner can receive a boost in their state of charge (SOC) in 1-3 hours or a complete charge in 4-8 hours, depending on the vehicle, voltage and SOC of the vehicle. EV operators are encouraged to charge their EVs at a home charging station to 100% SOC and use the publicly available charging stations to extend the range of the vehicle.

AC Level 2 is typically described as the “primary,” standard,” or “preferred” method for the EVSE for both private and publicly available facilities, and specifies a single-phase branch circuit with typical voltage ratings from 220 – 240 volts AC (VAC). The J1772-approved connector allows current as high as 80 amps AC (100 amp rated circuit). However, current levels that high are rare, and a more typical rating would be 40 amps AC, which allows a maximum current of 32 amps. This provides approximately 7.7 kilowatt (kW) with a 240 VAC circuit.

The EV Project will install BLINK Charging Stations in two models of AC Level 2 charging stations: Wall Mount and Pedestal.



Figure 4. Level 2 Wall Mount Unit



Figure 5. Level 2 Pedestal Unit

3.3 DC Fast Charging

Direct Current (DC) Fast Charging, or “Fast Charging”, is designed for commercial and public applications and is intended to perform in a manner similar to a commercial gasoline service station in that recharge is rapid. Typically, a DC Fast Charger (DCFC) would provide a 50% recharge in 10 to 15 minutes. EV charging using a DCFC brings DC current directly to the vehicle battery. An EV owner can receive a boost in their SOC in 5-15 minutes or receive up to 80% SOC in less than 30 minutes.

Not all vehicles are equipped to receive a DC charge. The Nissan LEAF and Mitsubishi i-Miev are the only two vehicles currently available in the U.S. that offer a DC charging port. The connector has not been standardized by the SAE to date. The EV Project DCFC stations will use the connector that is the standard in Japan. The Nissan LEAF offers the DC charging port as an option. The EV Project provides this option at no cost for participating vehicles.



Figure 6. CHAdemo DC Charging Connector

4 Tennessee Scope

By September of 2011, a mature EV charging infrastructure will exist in the State of Tennessee. Through a highly collaborative and interactive approach including policy makers, utilities, local, state and federal government agencies, grass roots organizations, major employers, charging station operators and leaders of industry, ECotality implements the EV Micro-Climate Process to complete the electrification of transportation and paradigm shift in the fueling of vehicles occurring through The EV Project.

4.1 Geographic Area

4.1.1 Electric Vehicle Charging Infrastructure Area Map Design

The EV Project established eligibility boundaries for participant residences surrounding the major cities in the project. These areas were then identified by their zip codes. In determining the area of coverage for the public infrastructure, the State Advisory Board considered the zip codes of those eligible for The EV Project vehicle participation, Nissan LEAF Hand Raiser data, the anticipated demographics of EV purchasers, topography, population, retail areas, major employer locations, and overall commuting patterns.

Early Adopters

Through the Nissan Customer Journey (<http://www.nissanusa.com>), those interested in receiving additional information were registered as a hand raiser from 4/20/10 until May 2010. Later, they could reserve a LEAF with a \$99 deposit. The anonymous geographic locations of those that registered through this process were reviewed on a periodic basis. The demographics of hybrid owners to date were another layer of data reviewed. Together, these two data layers demonstrated where early adopters would be located.

4.1.2 Area Specifics

Through the evaluation process for anticipated EV owner demographics, the demographics of hybrid and alternative fuel vehicle purchasers, overall population density, local topography, local and statewide traffic patterns were reviewed from a state perspective. The Tennessee Department of Transportation (DOT) along with the Nashville Metropolitan Planning Organization, Knoxville Transportation Organization and the Regional Planning Agency and Planning & Design Studio from Chattanooga, developed a sustainable mapping model for evaluating the areas where EVs are likely to travel.

From a grid perspective, understanding the areas where home based EV charging stations are is a new consideration for electric infrastructure growth strategies and long range planning. The local utilities, led by Nashville Electric Service, have created a standard mapping methodology for projecting the likely regions where electric vehicle home charging stations may appear.

4.1.3 Major Employers

The State of Tennessee's Department of Economic and Community Development supplied information on the location of the top 100 employers statewide (Appendix A). Employers affect traffic patterns and help determine commuter behavior. Their locations were considered a key element in the understanding EV travel patterns.

4.1.4 Traffic Patterns

EVs will intermingle with overall traffic and therefore the existing and projected traffic flows were heavily weighed within The EV Project infrastructure design. The Tennessee DOT provided data and data interpretation for this consideration.

4.1.5 The EV Project Infrastructure Coverage Map

The cities of Chattanooga, Knoxville, Nashville, and the connecting corridors comprise the core focus of The EV Project. This gives Tennessee the largest area of EV charging coverage from a national perspective. The following map illustrates the major city metropolitan areas along with nearby cities within The EV Project territory.

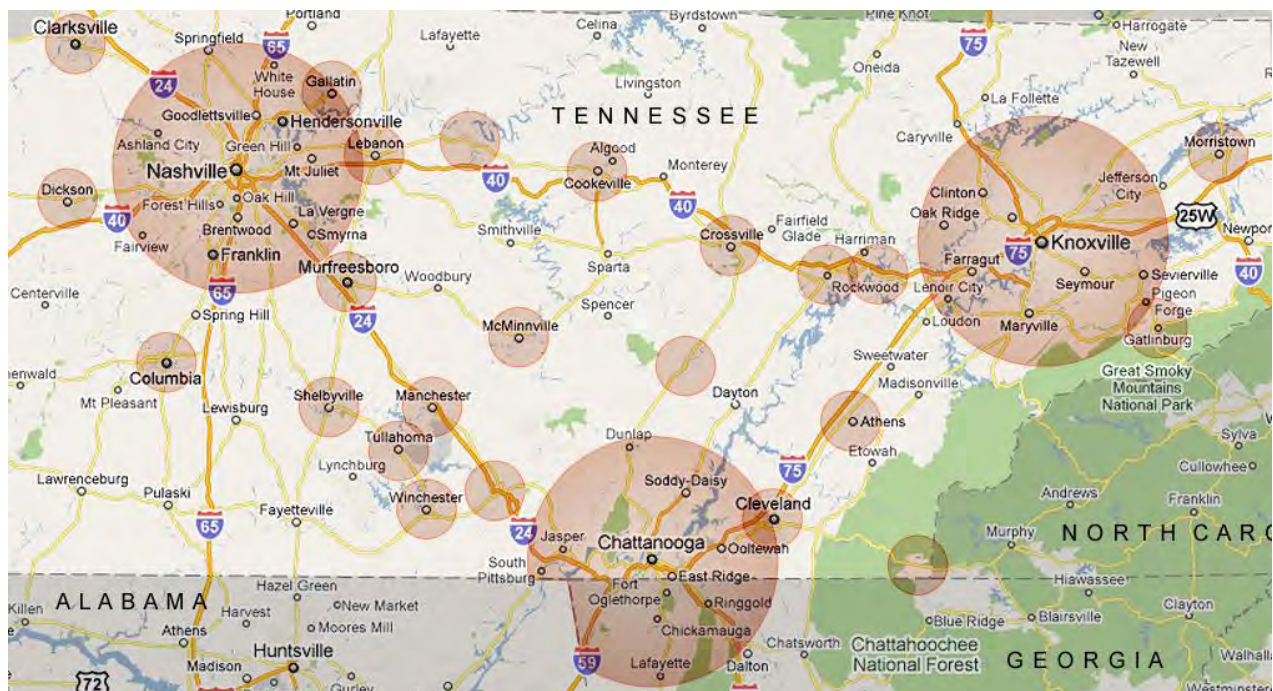


Figure 7. Tennessee Metropolitan Areas in The EV Project

4.2 Charging Station Objectives

4.2.1 Equipment

Table 4-1, below, represents the number of charging ports and participants that are planned to be included in the Tennessee EV Project Geographic Area.

Table 4-1. Charging Ports and Participants

Hardware Infrastructure	Tennessee
Level 2 Vehicle Participants	1000
Level 2 Commercial EVSE	1200
Level 2 Municipal EVSE	150
DC Fast Charging Ports	60
Solar Assisted L2 EVSE	125

4.2.2 Diversity of Choice by Charging Location Type

For The EV Project, understanding EV usage and driver behavior will allow an understanding of how to grow the EV public infrastructure once The EV Project data collection and analysis phases are complete.

The public infrastructure site selection process starts with a 25 mile circle from the city center for the three major metropolitan areas. Within this 25 mile circle, there will be a blanketing of EV charging infrastructure for public use. The 10 mile radius circles are overlapped to identify target areas where a diversity of choice by charging location type will be sought. Offering a location choice at which an EV owner will be able to charge will provide important information for the planning and development of the growth of EV infrastructure. The following show the diversity circles within each of the three project cities:

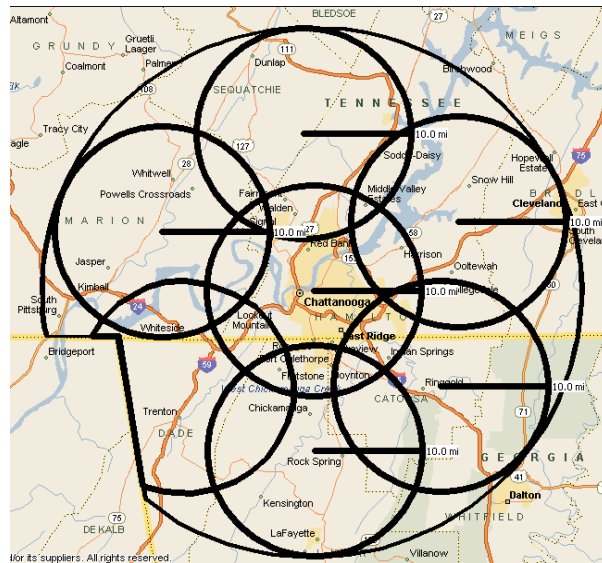


Figure 8. Chattanooga Infrastructure Planning Circle

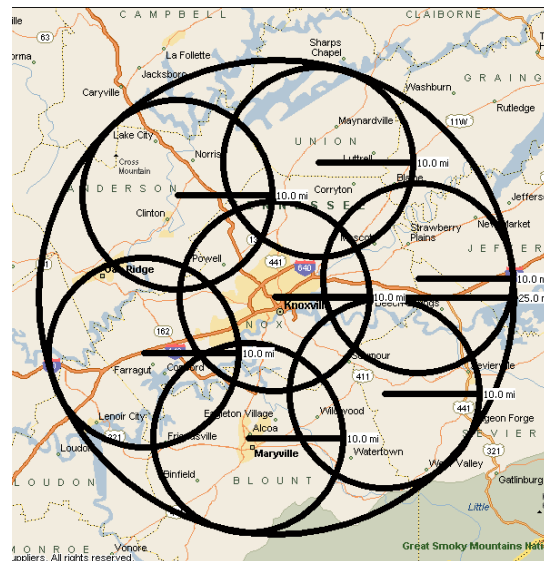


Figure 9. Knoxville Infrastructure Planning Circle

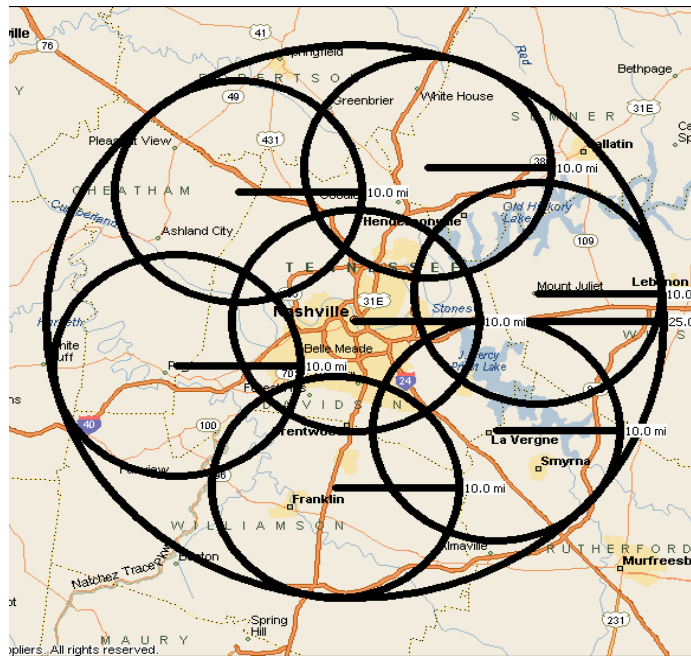


Figure 10. Nashville Infrastructure Planning Circle

4.2.3 Commercial Locations

For the 1,200 AC Level 2 charging stations, the following site types will be targeted within The EV Project: The goal of diversity by location of facility where charging occurs is created with the intention of understanding the places where people are most likely to recharge their EVs using AC Level 2 charging stations. Since little is known related to the types of venues expected to be visited, this diversity will provide valuable insight once EV driver behavior is observed.

Table 4-2. Targeted Venues and EVSE Quantities

Airports	6
Community Center/Parks	60
Convention Centers	15
Destinations	80
Educational	60
Grocers	125
Hotels	80
Libraries	15
Malls	125
Medical/Hospital	80
Parking/Park & Rides	80
Police	15
Restaurants	125
Retail	125
Theaters/Museums/Arts	80
Universities	80
Sub Total:	1151
Other	49
Total	1200

These targets will be satisfied through the combined efforts of National Accounts from ECOtality and the local efforts of stakeholders and the Stakeholder Services Area Manager.

4.2.4 Municipal Locations

The three core The EV Project cities will experience a blanketing of public charge infrastructure. Each of these cities was provided a targeted quantity of AC Level 2 charging stations. They each evaluated the properties they owned to determine which were most likely to serve the early adopters and that would demonstrate the areas support for EVs.

4.3 Charging Station Planning

4.3.1 Chattanooga Hamilton County Regional Planning Commission and the Regional Planning Agency (RPA)

The Chattanooga-Hamilton County Regional Planning Commission was created in the early 1950's as a result of a state law. The Planning Commission is a voluntary body of 15 members largely appointed by the Mayor of the City of Chattanooga and the Hamilton County Mayor. Its role is to make zoning and land use recommendations to the local legislative bodies and to make final decisions on subdivision requests for Hamilton County and most municipal governments. The Regional Planning Agency (RPA) is a joint agency of the City of Chattanooga and Hamilton County. The staff is comprised of professional city planners, urban designers, researchers, graphic designers and administrative personnel. Its major responsibilities include developing land use plans and transportation plans, administering zoning, proposing development policies, and reviewing new subdivisions and other development projects. The RPA sends Staff recommendations for zoning requests to the Chattanooga-Hamilton County Regional Planning Commission and other area Planning Commissions.

The RPA created area maps to assist in the planning of EV infrastructure for the Chattanooga area. Three separate maps were created to better understand the demand for EV infrastructure for three different uses: Tourism/Recreation, Employment and Residential.

Traffic Analysis Zones (TAZs) and Census Block Groups were chosen as the main unit of analysis for the maps. TAZs were chosen because they are available for most large metro areas, contain household and employment data and include forecasts. Census Block Group data was chosen because it is available for all metro areas and contains income and education information. The table below outlines the GIS layer used, potential sources for that data and maps that referenced the GIS layer.

GIS Layer	Data Source	Maps Using GIS Layer
Aerial	Planning Dept./GIS Dept./ ESRI World Imagery	Tourism, Residential, Employment
Travel Demand Model (TDM) Traffic Analysis Zones (TAZ)	Planning Dept./GIS Dept.	Residential, Employment
2000 Census Block Groups	Planning Dept./GIS Dept./ ESRI 2000 TIGER Data	Residential
2000 Census Summary File 3	Planning Dept./GIS Dept./ Census Website	Residential
County	Planning Dept./GIS Dept./ ESRI 2000 TIGER Data	Tourism, Residential, Employment
Street Layer	Planning Dept./GIS Dept./ ESRI 2000 TIGER Data	Tourism, Residential, Employment
Water	Planning Dept./GIS Dept./ ESRI 2000 TIGER Data	Tourism, Residential, Employment
Airport	Planning Dept./GIS Dept.	Tourism, Residential, Employment
Top 20 Employers	Planning Dept./GIS Dept./ Chamber of Commerce	Employment
EV Charging Stations	EVProject Local Advisory Board	Tourism, Residential, Employment
Recreation / Tourist Sites	Planning Dept./Parks Dept./ GIS Dept.	Tourism
Transit Data	Transit Agency/ Planning Dept./ GIS Dept.	Tourism

Figure 11. GIS Layer Information

The maps generated also show the locations for the planned EV Infrastructure charging stations.

Tourism/Recreation Map

The tourism/recreation map identifies the major tourism and recreational attractions in the Chattanooga area. This information was overlaid on top of the public EV charging stations to show where the two overlap.

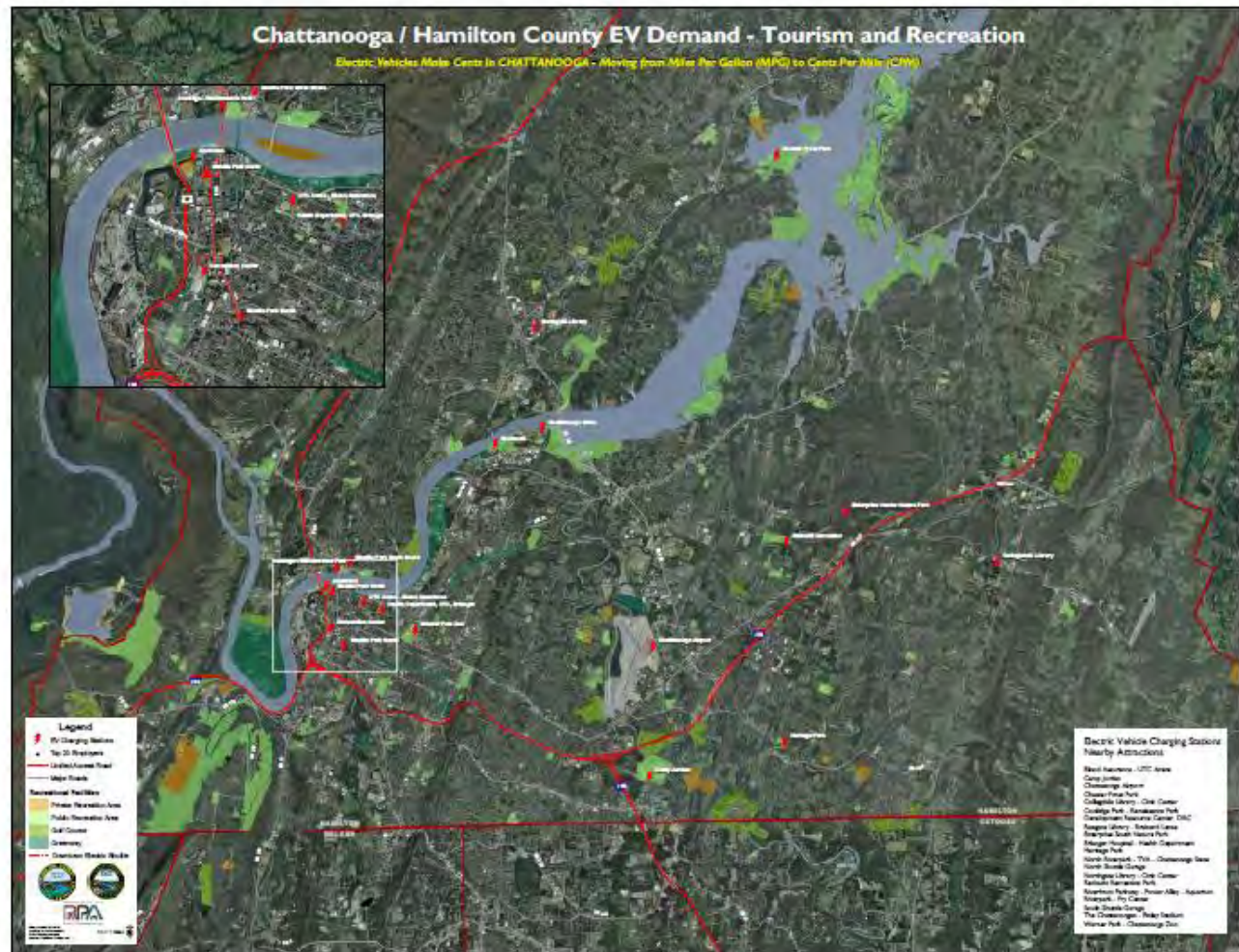


Figure 12. Chattanooga Tourism/Recreation Infrastructure Map

Employer/Employee Map

The second map was a heat map layer showing concentration of employees within the study area with the employment field of the TAZ used as the population field (Figure 13).

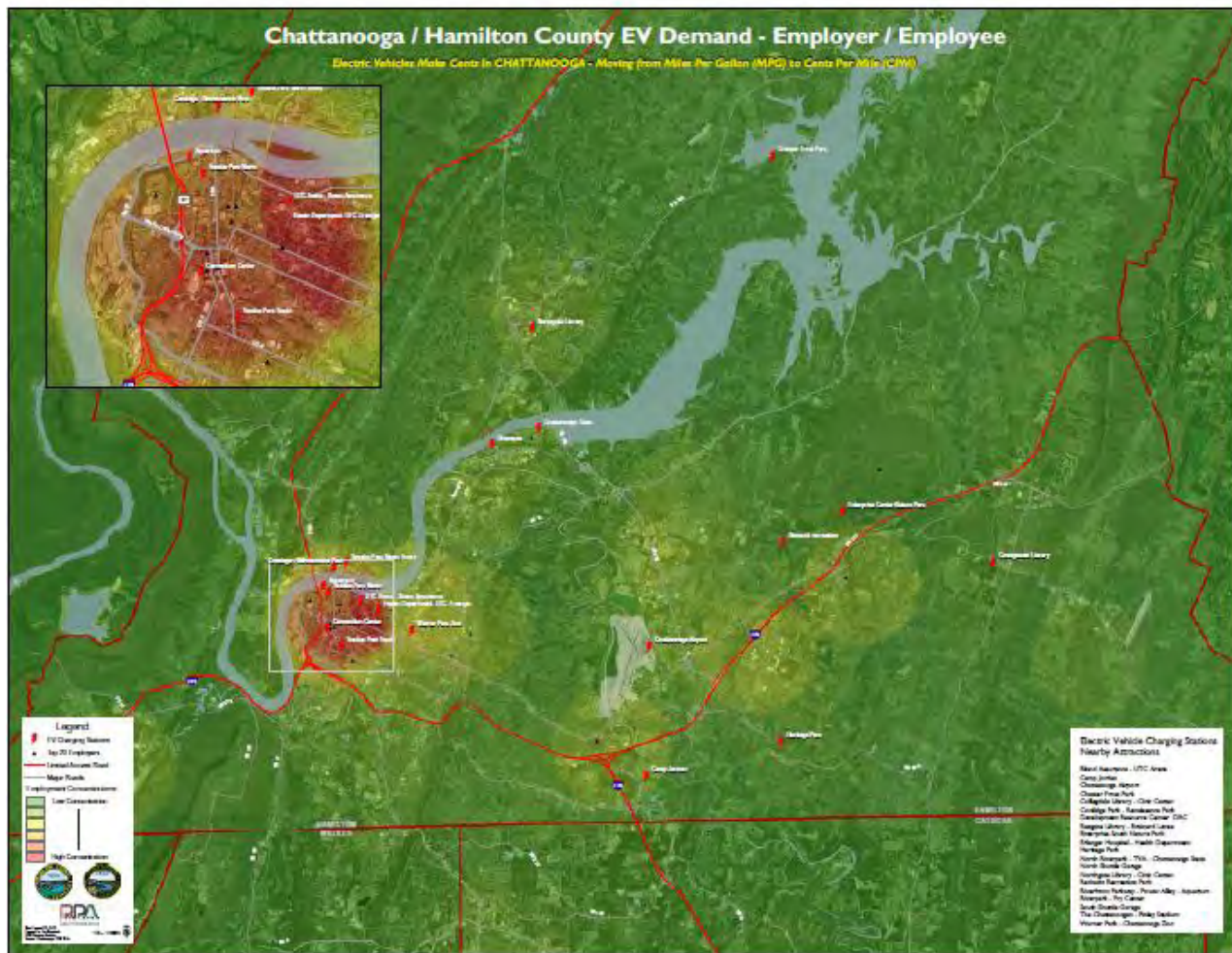


Figure 13. Chattanooga Employment Infrastructure Map

Residential Map

Household concentrations were mapped again with the project locations of the EV Charging Infrastructure (Figure 14). Some basic research was done on the target market for EVs, specifically early adopters. Overall, very little public information is available but several sources suggesting higher income and education levels being two primary factors. Using this information, the early adoption block groups were identified as those where 1/3 or more of the households made over \$75,000 dollars (double the area median household income) and where 1/3 or more of the individuals over 24 are college educated.

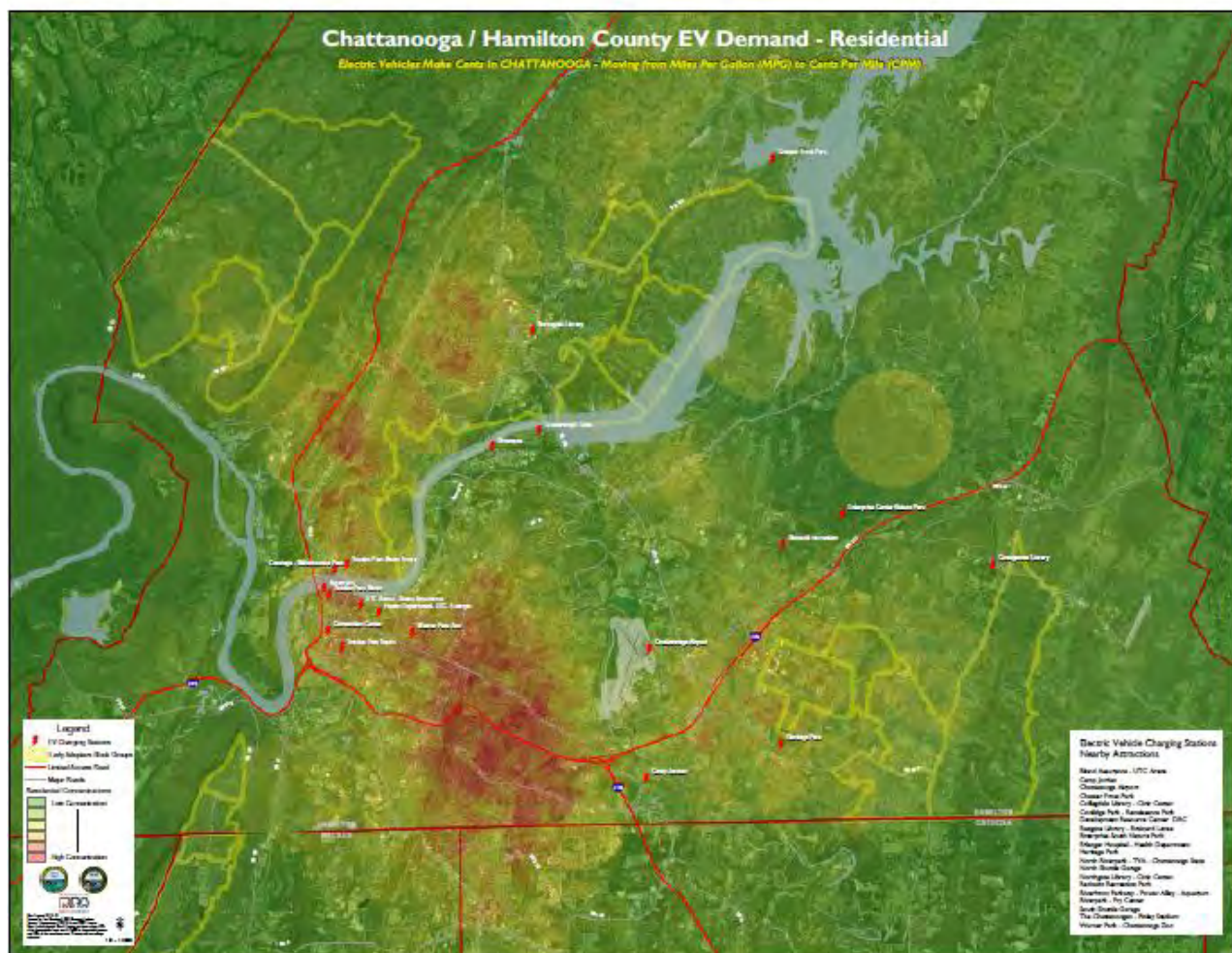


Figure 14. Chattanooga Residential Infrastructure Map

4.3.2 Nashville MPO

The Nashville Area Metropolitan Planning Organization (MPO) is a multi-county association (Figure 15) of local governments directed by a board of city and county mayors from across the greater Nashville area who have a shared responsibility to help the region fulfill its goals for livability, prosperity, sustainability and diversity through strategic investments in transportation infrastructure. That includes investments in roads and bridges, but also walking, biking, and mass transit too.

At its core, the MPO is responsible for two important tasks. 1) To develop a regional transportation plan that sets forth a vision for how our transportation system will serve residents, businesses, and visitors over the next couple of decades; and 2) To select projects and programs for federal funding. The MPO mayors, working closely with Tennessee DOT, are focused on funding projects and programs that are most beneficial to the region as a whole.

The guiding principles, regional goals, and major objectives of the Tennessee MPO's 2035 Regional Transportation Plan are identified in Appendix B.

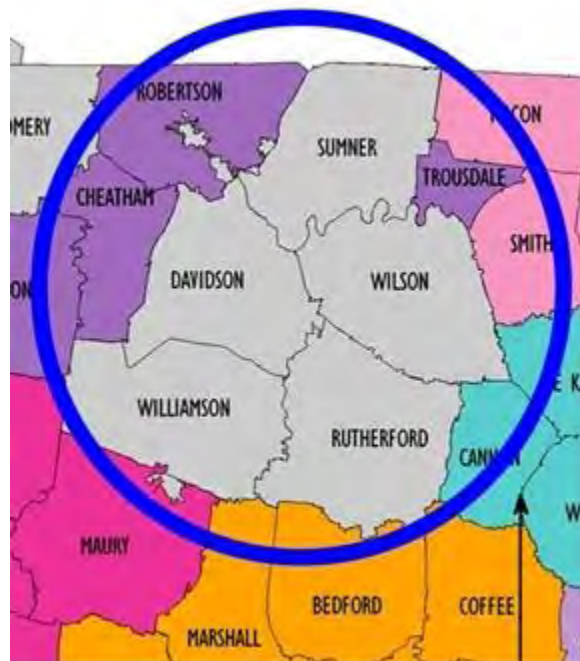


Figure 15. Nashville MPO Region

The Nashville MPO determined that MPOs have a major role to play in contributing data, modeling, and transportation planning expertise to EV policies and EV infrastructure planning and determined that "...because EVs are already being sold and charging stations are being installed, the comprehensive planning that should have been done in front of this paradigm shift in transportation is lagging." (Nashville MPO "How do EVs integrate with the area's overall support of clean fuels, clean air and existing green transportation initiatives?")

4.3.3 EV Charging Infrastructure Suitability Factors

In order to establish the most suitable areas of the region for the deployment of publicly accessible AC Level 2 EVSE, the Nashville MPO established five (5) main suitability factors that reflect the varying degrees of potential demand across census blocks.

1. Proximity to Interchange Locations: Census blocks within ¼ mile of existing controlled access interchanges (Figure 16).

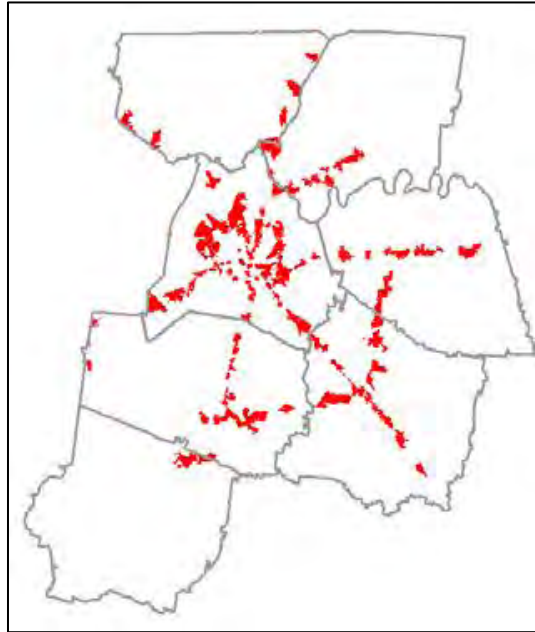


Figure 16. Proximity to Interchange Locations

2. Proximity to Transit Stations/Park-N-Ride Lots (Figure 17): Census blocks within ¼ mile of existing transit stations and park and ride lots.

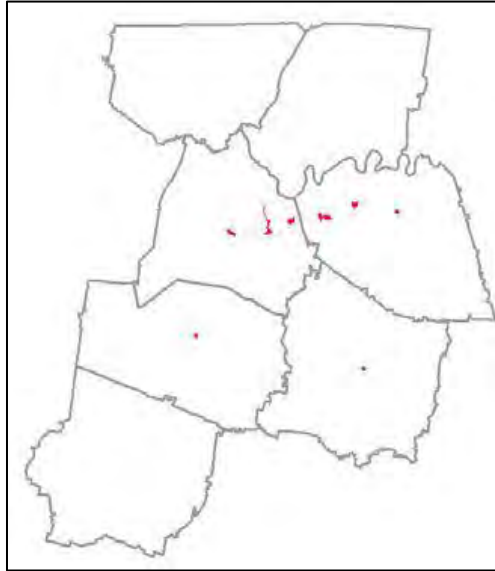


Figure 17. Proximity to Transit Stations

3. Average Distance of “Home-Based/Other” Trips (Figure 18): Average distance of trips that end in a census block made for a “home-based/other” purpose (e.g., home to school, home to grocery, gas station to home, etc.) as predicted for the base year (2008) by the MPO’s regional travel demand model.

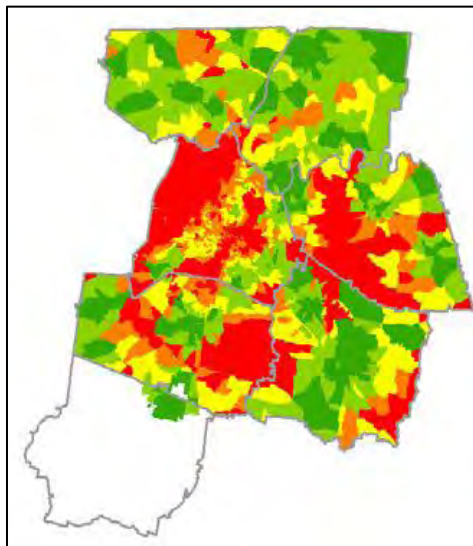


Figure 18. Average Distance of HBO Trips

4. Percentage of Trips made as “Non-Home-Based/Other” (Figure 19): The percentage of trips that end in a census block made for a “non-home-based/other” purpose (e.g. work to school, gas station to movie theatre, etc.) as predicted for the base year (2008) by the MPO’s regional travel demand model.

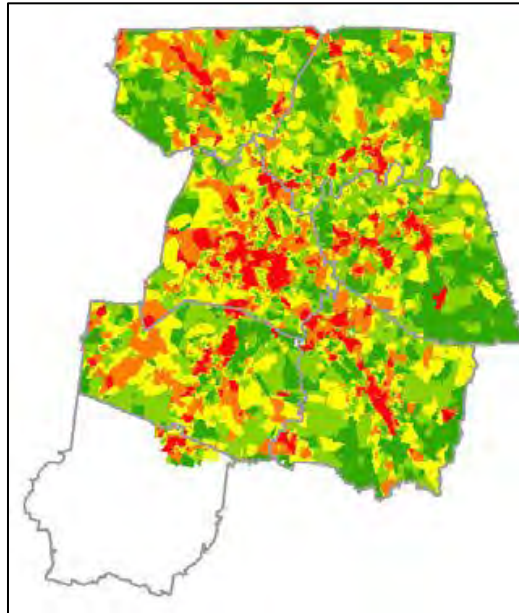


Figure 19. Percentage of Trips Made as NHB

5. Users per Day (Figure 20): Relative measure of customers/visitors in each census block as dictated by the number and type of retail establishments (e.g. storefronts, movie theatre, sporting venues, etc.) in the block and other blocks within a ¼ mile radius.

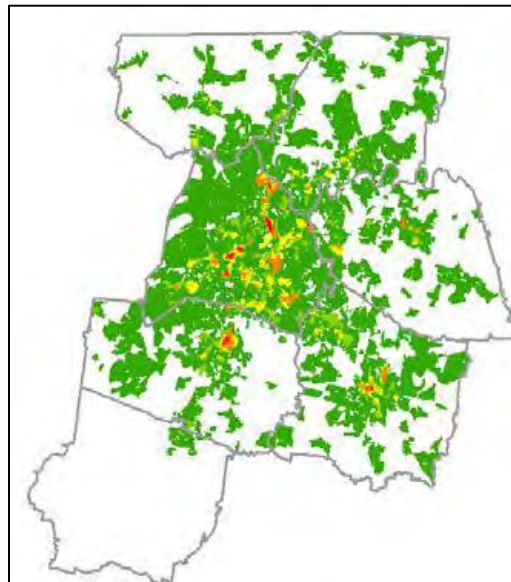


Figure 20. Users per Day

Working with the Stakeholder team, the MPO will develop a set of weights to adjust the relative importance of the individual factors. These maps can then be layered to create a map of the ideal locations for EV infrastructure. The initial modeling results in an un-weighted score.

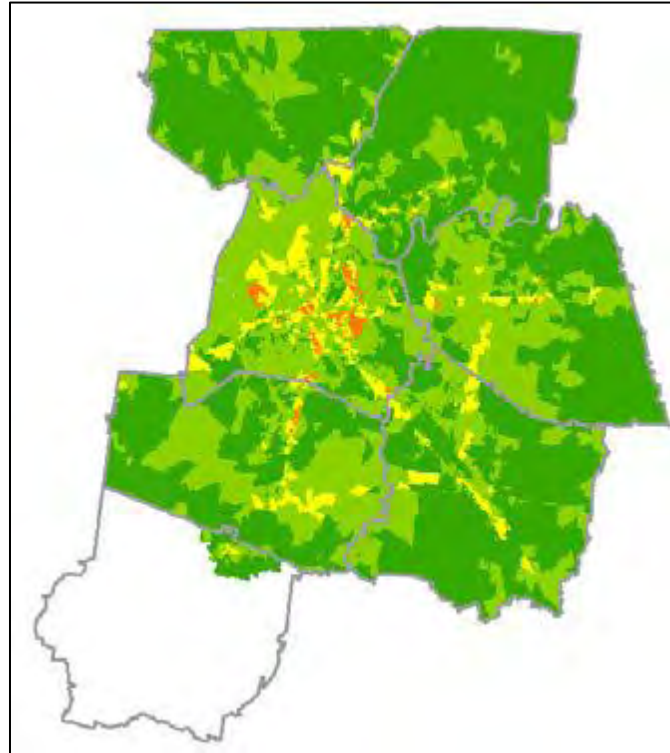


Figure 21. Composite Score – Un-weighted

The final map would show the most desirable locations which meet the weighted factors, which would be shown in red with lesser importance in yellow, light green and darker green locations (Figure 21). The intent then would be to solicit charging site hosts in the areas identified by the weighted composite.

5 Special Projects

5.1 Solar Assisted Charging Stations

The Tennessee portion of The EV Project has an additional type of charging infrastructure deployed: solar-assisted charging stations. Oak Ridge National Laboratory (ORNL) received \$6.8M in grant funding within the DOE's \$99.8M American Recovery and Rehabilitation Act (ARRA) funding under DE-EE-0002194 for this demonstration project.

ORNL, in conjunction with the Electric Power Research Institute (EPRI) and the Tennessee Valley Authority (TVA), will install the SMART (Smart Model Area Recharge Terminal) Station to analyze the technical issues arising from vehicle charging infrastructure (grid response, etc.) and to collect data on performance, component reliability, etc. and provide subsequent data reduction and analysis for deployment feedback (Appendix C).

These charging stations have AC Level 2 EVSE units and will be implemented under a solar canopy within the TVA SMART Station. There are 125 charging stations that will be solar-assisted charging stations (Appendix D).

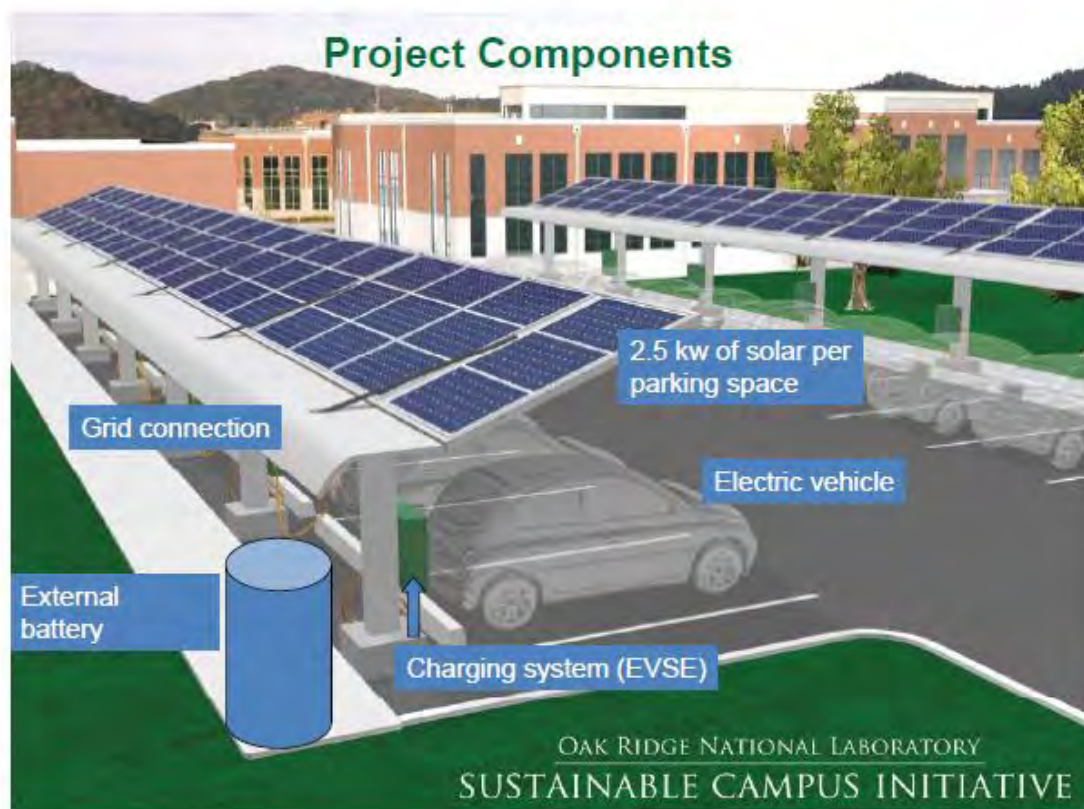


Figure 22. Oak Ridge Solar Assisted Recharging Concept

5.1.1 Corridor Charging

Providing for the travel between the project's core cities of Chattanooga, Knoxville and Nashville is another unique aspect to the Tennessee portion of The EV Project. The State of Tennessee will place charging stations along I-24, I-75 and I-40 to allow for the ability for a DCFC equipped EV to travel between the three cities on battery power only. DCFCs will be placed at strategic locations along these corridors to facilitate this travel.

5.1.2 Other Special Projects

Within The EV Project, there is opportunity for other special projects and pilot projects.

ECOtality is exploring the opportunity to participate in various special projects, including: smart grid integration with the Nashville Electric Service, Knoxville Utilities Board, and Electric Power Board; a Workplace Charging Impact Study coordinated by the Chattanooga, Knoxville, Nashville and State Chambers of Commerce; and a local Garage-Less Needs Analysis led by the Metropolitan Planning Organization. Additional special projects may be considered.

6 Implementation Process

6.1 EV Micro-Climate Program

ECotality is highly experienced with installing EV charging stations in residential, commercial and public environments, and has installed more charging stations for on-road applications than any other company. ECotality has developed its EV Micro-Climate program, as means of utilizing this experience to develop rich charge infrastructures, focused on AC Level 2 and DCFC systems, as efficiently and cost effectively as possible.

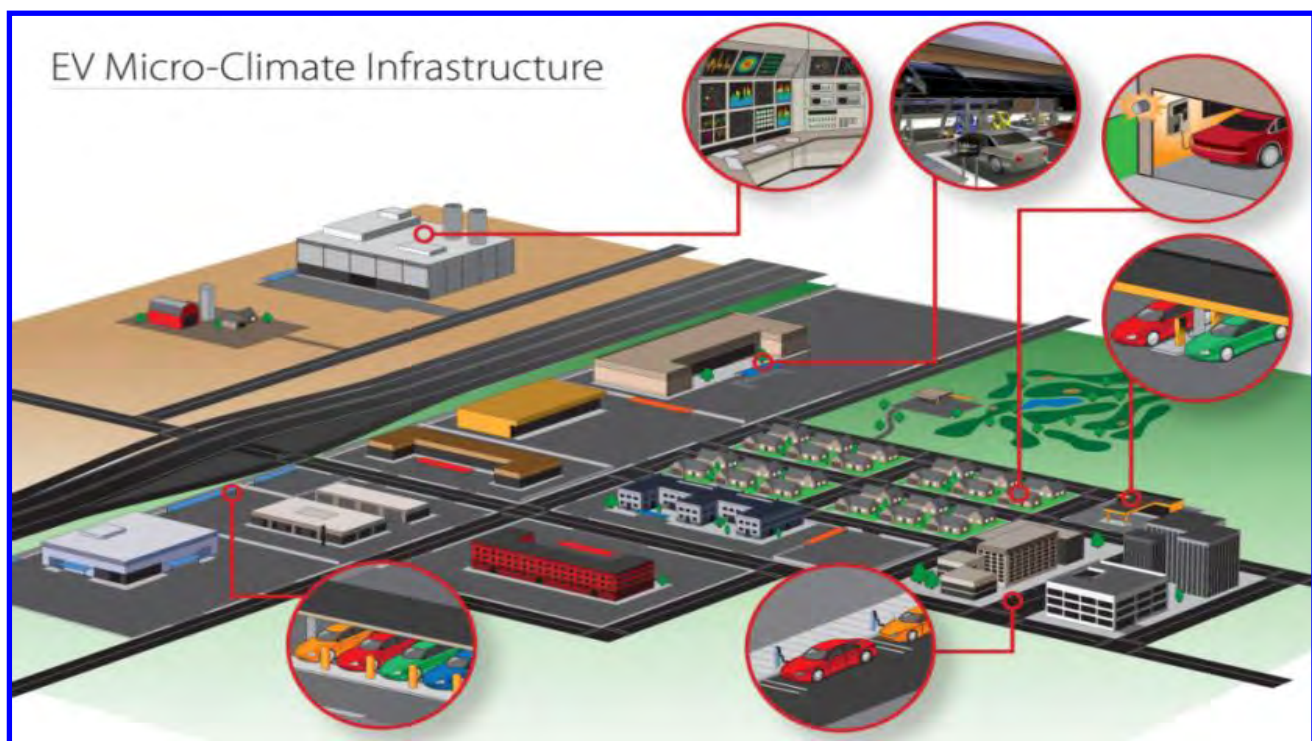


Figure 23. EV Micro-Climate Component Planning

6.2 Fueling Paradigm Shift

The EV Micro-Climate program is an integrated turn-key program that advances select areas for the adoption of electric transportation. Beginning with extensive feasibility and infrastructure planning studies, the program provides a blueprint for a comprehensive EV infrastructure system and provides detailed action plans for its successful execution and continued maintenance. ECotality coordinates activities with relevant governmental organizations, utilities, automotive manufacturers, and strategic regional organizations to ensure that key cities are prepared for consumer adoption of electric transportation.

The implementation of an EV Micro-Climate includes physical charge infrastructure installations at residential, commercial and public locations, as well as comprehensive regulatory, public awareness and marketing programs to support the various value chains associated with the EV Micro-Climate.

The EV Micro-Climate™ is a process by which a custom EV infrastructure results from the implementation of a standard process. Documenting the process by which a highly functional and scalable EV charging infrastructure is grown through public/private partnerships creates “Best Practices” for wide spread EV adoption. EV Micro-Climate™ results in an understanding of how consumers use EVs and charging infrastructure, which leads to the publication of Lesson Learned.

Together, with a core stakeholder group, the EV Micro-Climate™ creates a framework from which the infrastructure develops. Ongoing stakeholder engagement ensures that the projects goals and objectives are met in the near term and provides opportunity to discuss the opportunities and challenges of using electricity as a fuel.

6.3 Stakeholder Involvement

The key deliverables for The EV Project are Best Practices for the implementation of EV charging infrastructure, Lessons Learned about how vehicle operators use EVs, and the charging infrastructure. The EV Micro-Climate Program involves significant stakeholder interaction of the processes by which the stakeholder groups manage.

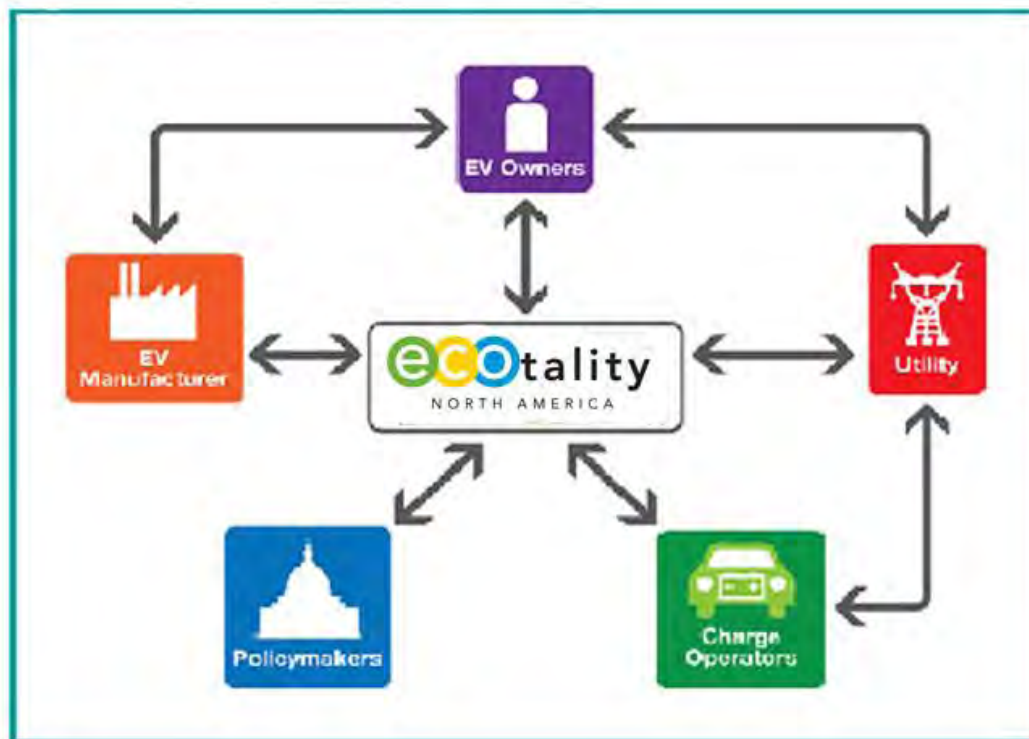


Figure 24. EV Micro-Climate Stakeholder Interaction

This standard process results in a custom infrastructure, whether it is applied on the macro level, as in the case of The EV Project, or on the micro level, as with a particular organization or fleet as in the Clean Commute Program in New York City.

The Micro Climate Process encourages a very interactive relationship with all stakeholders. To manage this process, ORNL has provided a password protected web portal for information sharing and exchange. Through the web portal, the various project documents, research material, media clips, project presentations, meeting notes and agendas, and schedules for the ECOtality staff are made available to the group for maximum stakeholder input. The result of the EV Micro Climate Process is a truly rich, highly functional and customized EV charging infrastructure.

7 Stakeholder Organization

There are four Advisory Boards that have been created for The EV Project in the State of Tennessee. The Advisory Boards review and contribute content to documents in The EV Project Process.

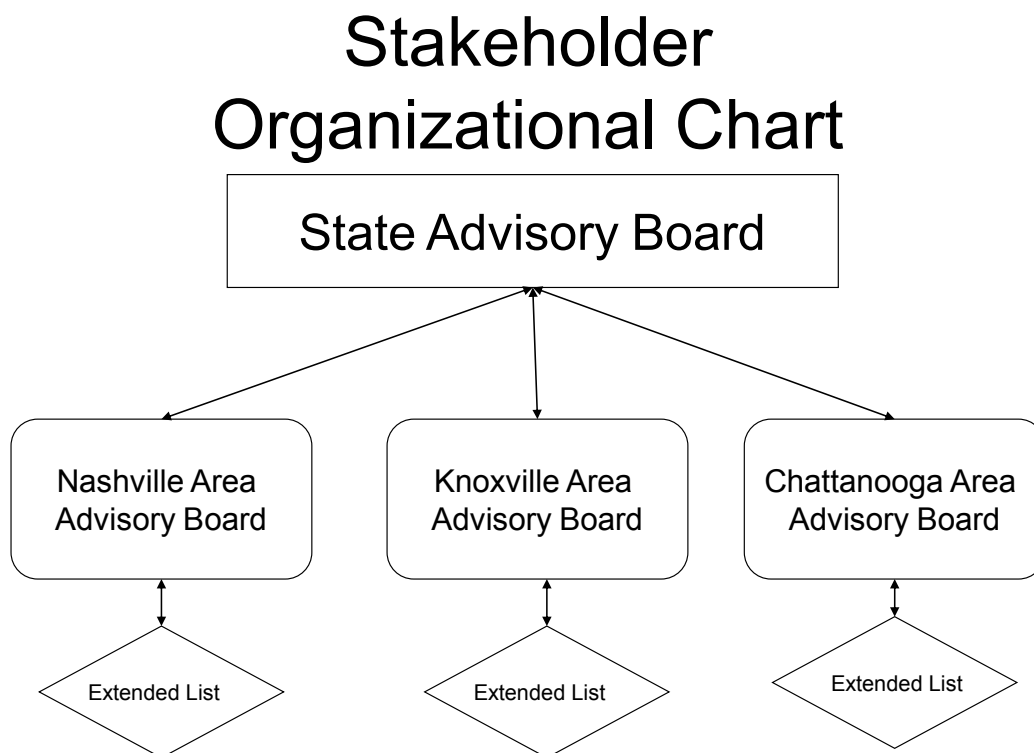


Figure 25. Tennessee State Advisory Board

7.1 EV Project Documents

The project documents include: The EV Project Infrastructure Deployment Guidelines (published separately), the Long Range EV Charging Infrastructure Plan for Tennessee (published separately), and this document, the EV Project Micro-Climate Plan.

The documents involved will remain active and under ongoing evaluation resulting in continually relevant project documentation of the Best Practices for growing EV charging infrastructure.

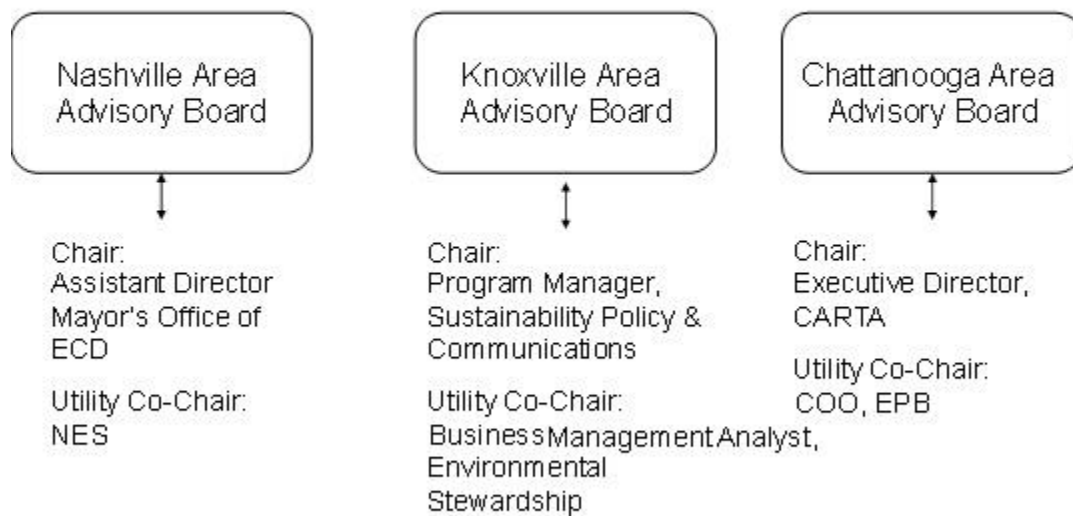
7.2 Area Advisory Boards

The Advisory Boards consisted of core members and member organizations from both the utility and private sector. The focus during Phase I of the infrastructure design was on the overall education of the near term needs to achieve the long term EV infrastructure growth plan and policy issues, technology developments, impacts, opportunities and the considerations involved with wide spread EV adoption.

During the second phase of the Infrastructure Design, the board membership expanded to include members and organizations involved in alternative fuels, sustainable transportation, the private sector, and those interested in EVs and EV charging.

The Area Advisory Boards have a Local Government Chair and a Utility Co-Chair. The Area Advisory Board Chair functions as another point of contact for local area stakeholders, leads the local messaging, leads the siting focus group for the local area's municipal allocation of assets and assists in the coordination of the media and commercial partner outreach. The Area Advisory Board Utility Co-Chair functions as the point of contact for issues from a utility perspective for the area.

Area Advisory Board Chairs and Utility Co-Chairs



2

Figure 26. Area Advisory Boards

7.2.1 Area Advisory Board Coverage

Each Area Advisory Board will serve the needs of the core project city and the surrounding area. The Chattanooga area encompassed 25 miles from city center in Chattanooga and dips into Georgia.

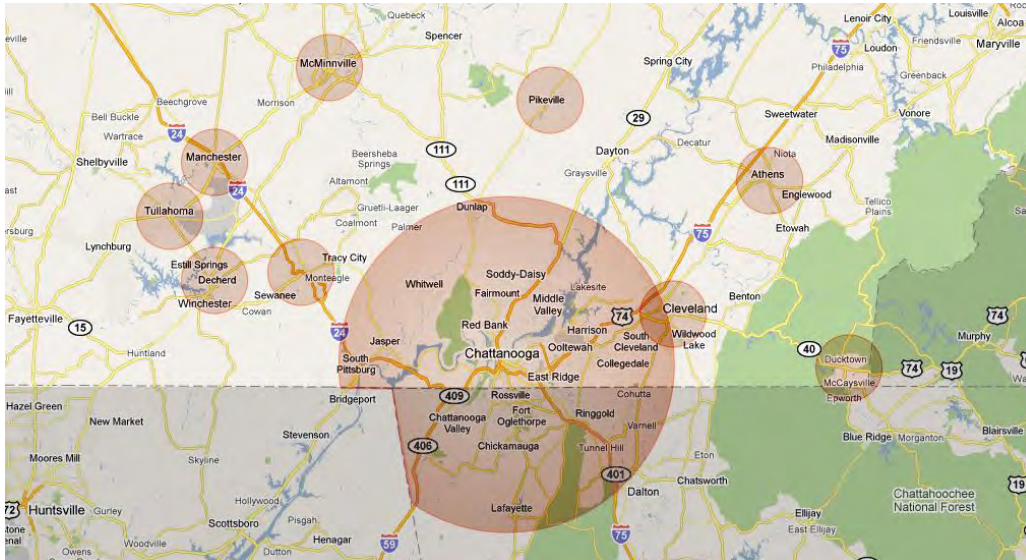
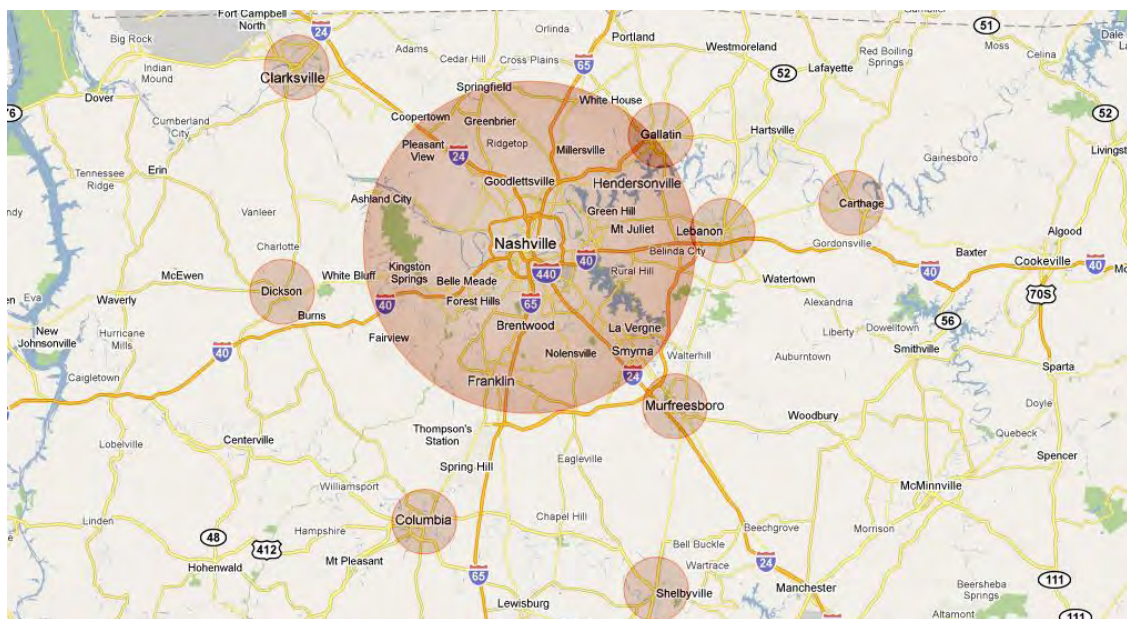


Figure 27. Chattanooga Area Board Planning Region

This map illustrates the geographic distribution of the five largest African American churches in the Knoxville, Tennessee area. The churches are marked with red circles and labeled: Ebenezer Baptist Church (Alcoa), Mount Zion Baptist Church (Knoxville), First Baptist Church (Knoxville), and two others in the surrounding area. The map shows major highways, cities, and geographical features like the Great Smoky Mountains National Park.

The Nashville Area serves 25 miles from city center of Nashville and the surrounding area.



31

7.3 Area Board Focus

The function of the Area Advisory Board is to actively engage in The EV Project for the purposes of understanding the impacts of wide spread EV adoption. These members individually and as member organizations work together to coordinate happenings of the EV Project, work through challenges that arise and to collaboratively create a custom electric vehicle charging infrastructure for the specific needs of the local area.

7.4 Board Dedication

The Advisory Boards meet regularly through teleconferences and group. During the meetings key stakeholders are educated on The EV Project deliverables, needs, goals and challenges for purposes of interactively engaging them in the design and implementation of the truly rich and highly functional EV charging infrastructure. Notes from these meetings are documented and disseminated back to the group. Each stakeholder organization contributes time, energy, staff and resources to The EV Project on a continuing basis.

8 Considerations Councils

In order to ensure that each opportunity and challenge is properly addressed throughout The EV Project, councils are formed for each major area of concern:

- Permitting, Inspection and Standards
- Utility Considerations
- Siting Council
- Public and Educational Outreach

These councils will meet periodically to ensure that project milestones are reached and that issues are either solved or logged and strategies created. Quarterly, these councils will present to the Advisory Boards as to developments occurring within each area of focus.

These councils will also be responsible for coordinating and composing the addendums necessary for keeping The EV Project documents current. Scheduled addendum submission dates are:

- November 2010
- March 2011
- December 2012
- June 2013

Advisory Boards & Considerations Councils

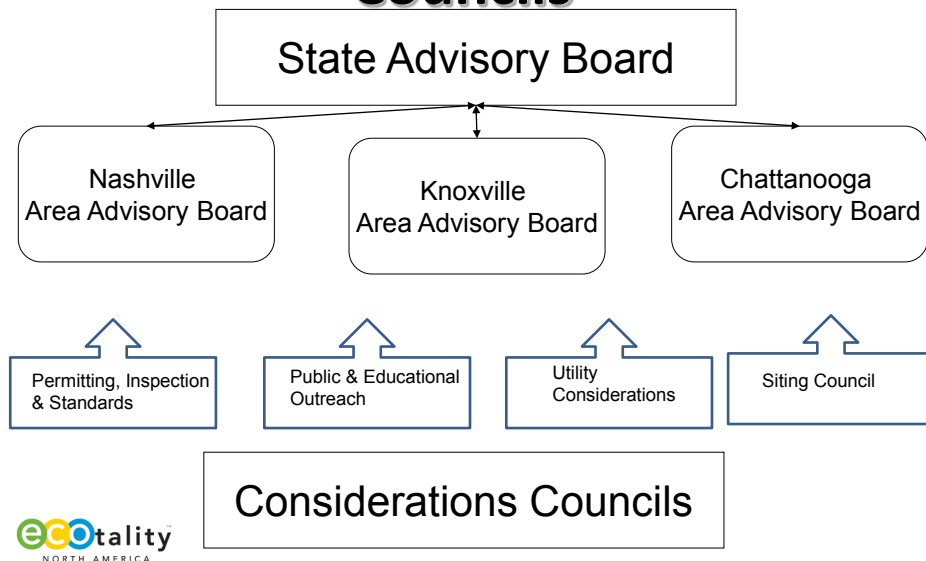


Figure 30. Considerations Councils

8.1 Permitting, Inspection and Standards

The installation of EVSE requires permitting and inspection from the local permitting and inspection office. The Considerations Council for Permitting, Inspection and Standards will seek to create a streamlined permitting and inspection process for The EV Project and for Best Practices for wide spread EV deployment and keep current on EV charging equipment and installation standards. The State of Tennessee's Department of Commerce and Insurance will lead this effort for permitting and inspection. The State of Tennessee has a strong interest in understanding how to ensure that the permitting and inspection processes can provide for a standardized and streamlined process. The EPRI in conjunction with the TVA will lead this effort for developing standards.

8.2 Utility Considerations

The use of electricity as a fuel requires the understanding and analysis of generation and electric grid impacts. EPRI and TVA, along with the Tennessee Valley Public Power Association (TVPPA) will jointly work toward collecting the relevant industry, technology and policy developments for the utility considerations and provide for the methodology for information dissemination to the utilities involved within the Tennessee market and through the TVA territory. This will keep the utility industry abreast of developments in The EV Project and in the EV and EVSE industry.

8.3 Siting Considerations Council

Siting of the EV charging stations engages all stakeholder organizations.

In order to ensure that a diverse set of charging site hosts are found to achieve a functional EV infrastructure, there needs to be input from multiple resources. The siting council consists of focus groups for industry specific consideration.

8.3.1 Zoning and Land Use Focus Group

Led by The University of Tennessee Municipal Technical Advisory Service, the Tennessee County Technical Advisory Service, and the Tennessee Renewable Energy Economic Council.

8.3.2 Hospitality Siting Focus Group

Led by the Tennessee Hospitality Association.

8.3.3 Medical/Hospital Siting Focus Group

Led by the Tennessee Hospital Association.

8.3.4 University Siting Focus Group

Led by the State of Tennessee Department of Economic and Community Development and Oak Ridge National Laboratory.

8.3.5 Destinations Siting Focus Group

Led by the State of Tennessee Department of Tourist Development in conjunction with the Tennessee Hospitality Association.

8.3.6 Retail and Grocery Siting Focus Group

Led by the Tennessee Retail Association and Tennessee Grocer and Convenient Store Association.

8.4 Public and Educational Outreach

Messaging within The EV Project will involve many facets within each member organization, area and with the various stakeholder groups. The State of Tennessee Department of Economic and Community Development, Southern Alliance for Clean Energy, and Oak Ridge National Laboratory will be key resources for this effort.

9 Infrastructure Design, Planning and Installation Schedule

9.1 Phase I

From March until June 2010, Phase I of The EV Project Infrastructure Design involved weekly teleconference meetings with each Advisory Board to discuss matters related to the successful implementation of a truly rich and highly functional EV charging infrastructure. Each series began with an initial kickoff meeting and working sessions in each area.

Each member organization was invited to participate with any members of their organization that they deemed necessary. Agendas were provided and notes taken for each meeting (Appendix E). There was a near 100% participation rate in the Phase I The EV Project Advisory Board meetings and teleconferences.

9.2 Phase II

During Phase II, from July through June 2011, stakeholders participate in advisory board meetings, and create considerations councils and focus groups.

Considerations councils will meet regularly to explore specific topics and be responsible for keeping the project documents current and relevant through the release of regularly scheduled updates and addendums.

Focus groups will assist in the siting of charging stations. They will hold strategy sessions, design industry specific messaging about EVs and The EV Project, and bring together industry leaders in roundtable discussions to identify how EV adoption will affect their businesses, find opportunities for case studies and conduct industry specific outreach.

9.3 Phase III

From October until December 2011, Phase III of The EV Project, also referred to as The EV Project Roadmap Process, will seek EV charging hosting sites that will create the diversity of choice in charging location type which will result in a truly rich EV charging infrastructure. Sites will be identified and site installation assessments will begin.

The considerations councils and focus groups begin meeting regularly to explore the challenges and opportunities for wide spread EV adoption. The considerations councils will bring updates to the advisory boards at least once each quarter:

- February
- May
- August
- October

9.4 Phase IV

During the next phase in The EV Project, from January until December 2011, installation of publicly available charging stations will take place. Each potential hosting partner will initiate The EV Project Hosting Partnership process by submitting an executed Letter of Intent (LOI) for The EV Project participation. The LOI demonstrates that an organization is interested in evaluating whether their location would be an ideal location for EV charging. The Hosting Partner is not obligated to participate in The EV Project through the LOI and The EV Project is not obligated to install The EV Project EV charging equipment at the site. The LOI is the first step in the process for being considered a potential charging location and The EV Project Charging Site Host.

There will be a site assessment performed on each site to determine the ideal low cost installation scenario. The certified contractor network (CCN), managed by ECOtality, will perform the site assessments and document any cost differential between the low cost installation scenario and the Charging Site Host's preferred installation site. Each commercial AC L2 EVSE unit installation will have \$1,200 (per unit) grant funding budget for installation costs from The EV Project.

9.5 Phase V

Concurrent with the installation of the EVSE and continuing until the end of The EV Project, the collection and analysis of the data provided by the residential and public EVSE as well as the data provided by the Project vehicles will be conducted. This will result in understandings of the behavior of the EV driver, their use of public infrastructure and lessons learned related to the effectiveness of public infrastructure in the encouragement of the deployment of EVs.

9.6 The EV Project Legacy

The State of Tennessee, by participating in The EV Project, takes a leadership role in furthering the understanding of EVs and charging infrastructure. With a continued focus on sustainability and the environment, the collaborative effort that is taking place through the EV Micro-Climate process, allows Tennessee to demonstrate how working together, through public and private partnership can have a lasting positive impact for the region and set the example for sustainable practices. As market penetration continues to grow, the Tennessee Valley has the strategies in place to support EVs.

Appendix A – Largest Tennessee Employers



**Largest Employers In Tennessee
By Individual Company Location – 500 + Employees**

State of Tennessee
Department of Economic and Community Development
Division of Research and Planning

April 11, 2008



LARGEST EMPLOYERS IN TENNESSEE

By Individual Company Location - 500+ Employees

A & L Industrial Construction & Maintenance Inc

1440 Shipley Ferry Rd E

Kingsport, TN 37663

Phone: 423-239-3826 Employees: 840

Contact: Mr Roy L Adams, President

236210 New industrial building construction;
industrial or commercial cleaning services

A & L Industrial Construction & Maintenance Inc

1780 Jared Dr

Kingsport, TN 37660

Phone: 423-246-1082 Employees: 1000

Contact: Mr Boyd Lewis, Accounting Mgr

236220 Industrial building & warehouse construction

Aadg Inc

9159 Telecom Dr

Milan, TN 38358

Phone: 731-686-8345 Employees: 600

Contact: Ms Linda Newman, Exec Officer

332321 Manufactures metal doors, sash & trim

Accredo Health Inc

1640 Century Center Pkwy

Memphis, TN 38134

Phone: 901-385-3600 Employees: 729

Contact: Mr David D Stevens, CEO

325412 Manufactures diagnostic substances; kidney
dialysis center

Advanced Call Center Technologies LLC

3035 Boones Creek Rd

Johnson City, TN 37615

Phone: 423-283-5000 Employees: 683

Contact: Mr Joseph Lembo, Member

561421 Telephone service

Advantage Personnel Consultants Inc

5502 Brainerd Rd

Chattanooga, TN 37411

Phone: 423-499-9397 Employees: 1500

Contact: Ms Ann Fowler, President

541612 Personnel management consulting services

Adventist Health System Sunbelt Healthcare Corp

500 Hospital Dr

Madison, TN 37115

Phone: 615-865-2373 Employees: 1070

Contact: Ms Melissa Waddey, COO

622110 Medical hospital

Aerospace Center Support

100 Kindell Dr Ste A211

Tullahoma, TN 37388

Phone: 931-454-3000 Employees: 1200

Contact: Mr Gary P Hobbs, Principal

561210 Facilities support services

Aerospace Testing Alliance

600 William Northern Blvd

Tullahoma, TN 37388

Phone: 931-454-4397 Employees: 2100

Contact: Mr David Elrod, General Manager

541330 Engineering services

Affinion Benefits Group Inc

801 Crescent Centre Dr 200

Franklin, TN 37067

Phone: 615-764-2400 Employees: 550

Contact: Mr Dan Tarantin, CEO

561910 Packaging & labeling services

AGC Flat Glass North America Inc

PO Box 929

Kingsport, TN 37662

Phone: 423-357-2400 Employees: 750

Contact: Mr Norman Dykes, Supervisor

327211 Manufactures flat float glass

AGC Life Insurance Co

American General Center

Nashville, TN 37250

Phone: 615-749-1000 Employees: 1311

Contact: Mr Rodney O Martin, Ch of Bd

524113 Life insurance carrier

Ahom Holdings Inc

5200 Maryland Way Ste 400

Brentwood, TN 37027

Phone: 615-221-8884 Employees: 1891

Contact: Mr Joseph Ferlong, President

621610 Home health care services

Aim Healthcare Services Inc

PO Box 292377

Nashville, TN 37229

Phone: 615-503-1000 Employees: 1500

Contact: Mr Jim Sohr, President

561110 Financial management services for business;
systems software development service; data
processing & preparation services**Alcoa Inc**

300 N Hall Rd

Alcoa, TN 37701

Phone: 865-977-2011 Employees: 1000

Contact: Ms Faye Martin, Office Manager

331314 Aluminum refining & smelting; manufactures
aluminum**Allstate Security**

4770 Cromwell Ave Ste 14

Memphis, TN 38118

Phone: 901-794-4069 Employees: 500

Contact: Mr William Richardson, President

561311 Employment placement services

ALSTOM Power Inc

1119 Riverfront Pkwy

Chattanooga, TN 37402

Phone: 423-752-2100 Employees: 600

Contact: Robin Sentell, VP Human Res

541330 Engineering services; steel fabricator

American Building Maintenance Co of Georgia

4181 Senator St

Memphis, TN 38118

Phone: 901-368-9800 Employees: 555

Contact: Mr Scott Steward, Manager

561720 Janitorial & custodial services

American General Life & Accident Insurance Co

American General Center

Nashville, TN 37250

Phone: 615-749-1000 Employees: 1000

Contact: Mr James Weakley, CEO

524113 Life insurance carrier

American Ordnance LLC

2280 Highway 104 W Ste 2

Milan, TN 38358

Phone: 731-686-6101 Employees: 522

Contact: Mr Bill Teske, Engineer

332993 Manufactures missile warheads

American Residential Services

860 Ridge Lake Blvd

Memphis, TN 38120

Phone: 901-820-8400 Employees: 1300

Contact: Mr William E Le Baron, President

238220 Plumbing service; general electrical
contractor; appliance installation service;
retails electric household appliances**American West Trading Co Inc**

5576 Highway 70 W

Waverly, TN 37185

Phone: 931-296-4771 Employees: 600

Contact: Mr Charles E Mc Coy, CEO

316213 Manufactures men's boots; manufactures
women's boots; wholesales boots**America's Collectibles Network Inc**

10001 Kingston Pike Ste 57

Knoxville, TN 37922

Phone: 865-692-6000 Employees: 1800

Contact: Mr Charles A Wagner III, Ch of Bd

454113 Home shopping television order house

Anderson Services LLC

6016 Brookvale Ln 110B

Knoxville, TN 37919

Phone: 865-584-6714 Employees: 2328

Contact: Mr Dave Baumgartner, Member

484110 Local trucking without storage services

Aqua Glass Corp

320 Industrial Park Rd

Adamsville, TN 38310

Phone: 731-632-0911 Employees: 1000

Contact: Mr Robert W Ball, President

326191 Manufactures plastic bath, shower or laundry tubs; manufactures hydrotherapy whirlpool baths

ARC Automotive Inc

1721 Midpark Rd Ste B200

Knoxville, TN 37921

Phone: 865-583-7600 Employees: 650

Contact: Mr John E Skladan, President

336111 Manufactures motor vehicles & car bodies; manufactures motor vehicle parts & accessories

Armstrong Hardwood Flooring Co

PO Box 4009

Oneida, TN 37841

Phone: 423-569-8526 Employees: 667

Contact: Mr Floyd Sherman, CEO

321918 Manufactures hardwood flooring

Armstrong Wood Products Inc

PO Box 1334

Jackson, TN 38302

Phone: 731-422-7700 Employees: 550

Contact: Not Available

321918 Manufactures hardwood flooring

Armstrong World Industries Inc

565 Hartco Dr

Oneida, TN 37841

Phone: 423-569-9058 Employees: 500

Contact: Mr Phil Christianson, Manager

442210 Retailers floor coverings

Astec Inc

PO Box 72787

Chattanooga, TN 37407

Phone: 423-867-4210 Employees: 700

Contact: Mr Don Brock, Ch of Bd

333120 Manufactures construction machinery; manufactures burners, furnaces, boilers & stokers; manufactures heat exchangers, condensers & components

Asurion Corp

650 Grassmere Park 101

Nashville, TN 37211

Phone: 615-837-3000 Employees: 1500

Contact: Mr Bret Comolli, CEO

811198 Automotive road service; automobile owners association

Asurion Insurance Services Inc

648 Grassmere Park # 300

Nashville, TN 37211

Phone: 615-832-1146 Employees: 1190

Contact: Mr Bret Comolli, CEO

524210 Insurance broker

AT&T Mobility LLC

5155 Citation Dr 104

Memphis, TN 38118

Phone: 901-541-8500 Employees: 600

Contact: Mr Dan Zarndt, Manager

423690 Wholesales mobile telephone equipment

Automotive Components Holdings LLC

PO Box 1355

Nashville, TN 37202

Phone: 615-350-7500 Employees: 950

Contact: Not Available

327211 Manufactures flat glass; manufactures motor vehicle parts & accessories

Autozone Inc

PO Box 2198

Memphis, TN 38101

Phone: 901-495-6500 Employees: 1608

Contact: Mr William C Rhodes III, President

441310 Retailers automotive parts; retail business & non-game software

Baptist & Physicians Local Services Bureau Inc

350 N Humphreys Blvd

Memphis, TN 38120

Phone: 901-227-5117 Employees: 500

Contact: Mr Stephen C Reynolds, President

561110 Hospital management services

Baptist Health System of East Tennessee

PO Box 1788

Knoxville, TN 37901

Phone: 865-632-5011 Employees: 2500

Contact: Mr Bill Torrence, Senior VP

622110 Medical hospital

Baptist Hospital of East Tennessee Inc

PO Box 1788

Knoxville, TN 37901

Phone: 865-632-5200 Employees: 1800

Contact: Dale Collins, CEO

622110 Medical hospital

Baptist Hospital West Inc

10820 Parkside Dr

Knoxville, TN 37922

Phone: 865-218-7011 Employees: 2000

Contact: Mr Warren Payne, President

622110 Medical hospital

Baptist Memorial Hospital-Memphis

6019 Walnut Grove Rd

Memphis, TN 38120

Phone: 901-226-5000 Employees: 4000

Contact: Mr Stephen C Reynolds, President

622110 Medical hospital

Bates Acquisition LLC

PO Box 249

Lobelville, TN 37097

Phone: 931-593-2251 Employees: 800

Contact: Not Available

326299 Manufactures molded rubber products

Bechtel Jacobs Co LLC

PO Box 4699MS729

Oak Ridge, TN 37831

Phone: 865-241-2000 Employees: 735

Contact: Mr John Hickey, CFO

561210 Environmental remediation services

BellSouth Corp

333 Commerce St Ste 2104

Nashville, TN 37201

Phone: 615-214-6520 Employees: 1200

Contact: Mr Marty Dickens, President

541690 Telecommunications consulting services;
wireless telecommunications carrier &
service; electrical contractor

Blount Memorial Hospital Inc

907 E Lamar Alexander Pkwy 1F

Maryville, TN 37804

Phone: 865-983-7211 Employees: 1850

Contact: Ms Joy Hurm, Corp Secy

622110 Medical hospital

Bluecross Blueshield of Tennessee Inc

801 Pine St

Chattanooga, TN 37402

Phone: 423-755-5600 Employees: 4144

Contact: Ms Vicky B Gregg, President

524114 Hospital & medical insurance carrier

Bobby Thomas

2300 Sitler St

Memphis, TN 38114

Phone: 901-774-6533 Employees: 500

Contact: Bobby Thomas, President

488510 Freight forwarding services

Boeing Co

767 Boeing Rd

Oak Ridge, TN 37830

Phone: 865-481-7602 Employees: 750

Contact: Mr Donald Long, General Manager

336411 Manufactures motorized aircraft;
manufactures aircraft parts & equipment;
manufactures search & navigation systems

Boeing Oak Ridge Co

767 Boeing Rd
Oak Ridge, TN 37830
Phone: 865-481-7100 Employees: 901
Contact: Mr Jerre Armstrong, Mfg Spvr
336413 Manufactures aircraft body assemblies &
parts; manufactures search & navigation
systems

Bradley County Memorial Hospital

PO Box 217
Brentwood, TN 37024
Phone: 423-559-6000 Employees: 850
Contact: Mr Ken Jackson, CFO
622110 Medical hospital

Bridgestone Firestone North American Tire LLC

PO Box 500
Morrison, TN 37357
Phone: 931-668-5500 Employees: 745
Contact: Mr Ron Benoit, Opers Mgr
441320 Tire dealer

Bridgestone Firestone North American Tire LLC

1201 Bridgestone Pkwy
La Vergne, TN 37086
Phone: 615-793-7581 Employees: 1800
Contact: Mr Jim Posey, Opers Mgr
441320 Tire dealer

Brother Industries Inc

7819 N Brother Blvd
Bartlett, TN 38133
Phone: 901-377-7777 Employees: 1200
Contact: Hiromi Gunji, Ch of Bd
333313 Manufactures typewriters & parts

Brother International Corp

7777 N Brother Blvd
Bartlett, TN 38133
Phone: 901-379-1051 Employees: 1200
Contact: Mr Jerry Dodds, Manager
333298 Manufactures household sewing machines &
attachments; wholesales industrial sewing
machines

BWXT Y-12 LLC

PO Box 2009
Oak Ridge, TN 37831
Phone: 865-574-1000 Employees: 4750
Contact: J A Fees, Ch of Bd
332993 Manufactures missile warheads;
manufactures guided missiles & space
vehicles

C B L & Associates Management Inc

2030 Hamilton Place Blvd # 500
Chattanooga, TN 37421
Phone: 423-855-0001 Employees: 1500
Contact: Mr Charles B Lebovitz, CEO
531120 Shopping center & mall operator

Calhoun Newsprint Co

PO Box 188
Calhoun, TN 37309
Phone: 423-336-2211 Employees: 900
Contact: Mr Walter Brunson, General Manager
322130 Paperboard mill

Calsonic North America Inc

PO Box 350
Shelbyville, TN 37162
Phone: 931-684-4490 Employees: 803
Contact: Mr Jim Batchlor, Manager
333415 Manufactures complete heating equipment

Calsonic North America Inc

201 Garrett Pkwy
Lewisburg, TN 37091
Phone: 931-359-4001 Employees: 640
Contact: Not Available
336399 Manufactures motor vehicle body
components & frames

Calsonickansei North America Inc

PO Box 350
Shelbyville, TN 37162
Phone: 931-684-4490 Employees: 1000
Contact: Kiyoto Shinohara, President
336391 Manufactures motor vehicle air conditioning;
manufactures motor vehicle parts &
accessories

Cendant Travel Inc

PO Box 291987
 Nashville, TN 37229
 Phone: 615-874-3000 Employees: 550
 Contact: Mr Scott Hancock, President
 561510 Travel agency

Ceramaspeed Inc

1227 McArthur Rd
 Maryville, TN 37804
 Phone: 865-681-7070 Employees: 500
 Contact: Mr Kevin R McWilliams, CEO
 335211 Manufactures electric household cooking
 appliances

Charleston Hosiery Inc

PO Box 2190
 Cleveland, TN 37320
 Phone: 423-472-5095 Employees: 600
 Contact: Mr William R Sanders, President
 315119 Manufactures men's, boys' & girls' hosiery;
 manufactures women's hosiery

Chattanooga-Hamilton County Hospital Authority

910 Blackford St
 Chattanooga, TN 37403
 Phone: 423-778-2141 Employees: 600
 Contact: Mr Jeff Abbott, Maint Mgr
 622110 Children's hospital

Claiborne County Hospital & Nursing Home

1850 Old Knoxville Rd
 Tazewell, TN 37879
 Phone: 423-626-4211 Employees: 575
 Contact: Ms Nancy Steadman, Opers Mgr
 622110 Medical hospital; skilled nursing care facility

Clayton Homes Inc

PO Box 9790
 Maryville, TN 37802
 Phone: 865-380-3000 Employees: 1500
 Contact: Mr Paul Nichols, President
 321991 Manufactures mobile homes; personal
 installment sales finance; provides property
 damage insurance; provides credit & other
 financial responsibility insurance; mobile
 home site leasing & rental; mobil

Cleveland Care & Rehabilitation Center

2750 Executive Park NW
 Cleveland, TN 37312
 Phone: 423-476-4444 Employees: 900
 Contact: Ms Helen L Stout, President
 623110 Skilled nursing care facility

CMH Homes Inc

5000 Clayton Rd
 Maryville, TN 37804
 Phone: 865-380-3000 Employees: 850
 Contact: Mr Kevin T Clayton, President
 453930 Mobile home dealer

Comcast Corp

660 Mainstream Dr
 Nashville, TN 37228
 Phone: 615-255-5900 Employees: 600
 Contact: Mr Virgil Caudill, General Manager
 515210 Pay television distribution

Comdata Network Inc

5301 Maryland Way
 Brentwood, TN 37027
 Phone: 615-370-7405 Employees: 1200
 Contact: Mr Richard Packard, Branch Manager
 518210 Data processing & preparation services

Comdata Network Inc

5301 Maryland Way
 Brentwood, TN 37027
 Phone: 615-370-7405 Employees: 1200
 Contact: Mr Richard Packard, Director
 518210 Data processing & preparation services

Commercial Furniture Group Inc

810 W Highway 25 70
 Newport, TN 37821
 Phone: 423-623-0031 Employees: 500
 Contact: Mr Michael Nelson, Opers Mgr
 337127 Manufactures restaurant furniture;
 manufactures wood office furniture

Concord EFS Inc

PO Box 30668

Memphis, TN 38130

Phone: 901-371-8000 Employees: 595

Contact: Mr Charles T Fote, CEO

522320 Electronic funds transfer network, including switching; wholesales automatic teller machines; charge account service; trusts, fiduciary & custody services

Cookeville Regional Medical Center

142 W 5th St

Cookeville, TN 38501

Phone: 931-528-2541 Employees: 1000

Contact: Ms Paula Randolph, Corp Secy

622110 Medical hospital

Correct Care Solutions LLC

3343 Perimeter Hill Dr # 300

Nashville, TN 37211

Phone: 615-324-5750 Employees: 1300

Contact: Mr Jerry Boyle, CEO

621111 Dispensary operated by physicians

Cosmolab Inc

1100 Garrett Pkwy

Lewisburg, TN 37091

Phone: 931-359-6253 Employees: 500

Contact: Ms Holli Montgomery, President

325620 Manufactures cosmetic preparations

County of Shelby

1075 Mullins Station Rd

Memphis, TN 38134

Phone: 901-386-4361 Employees: 500

Contact: Mr Larry Lucas, Branch Manager

622110 Medical hospital; public health program services

Covenant Transport Inc

PO Box 22997

Chattanooga, TN 37422

Phone: 423-821-1212 Employees: 1000

Contact: Mr David R Parker, CEO

484121 Over the road trucking

Covenant Transportation Group Inc

400 Birmingham Hwy

Chattanooga, TN 37419

Phone: 423-821-1212 Employees: 5000

Contact: Mr David R Parker, President

484121 Over the road trucking

Cracker Barrel Old Country Store Inc

PO Box 787

Lebanon, TN 37088

Phone: 615-444-5533 Employees: 603

Contact: Mr Michael A Woodhouse, President

722110 Full service chain family restaurant; retail gif shop

CSC Investments LLC

2600 Executive Park NW

Cleveland, TN 37312

Phone: 423-479-8208 Employees: 500

Contact: Mr Dan Cooke, Member

722110 Full service American restaurant

Cumberland Medical Center Inc

421 S Main St

Crossville, TN 38555

Phone: 931-484-9511 Employees: 850

Contact: Mr Jim M Mackin, President

622110 Medical hospital

Cummins Inc

4155 Quest Way

Memphis, TN 38115

Phone: 901-546-5600 Employees: 800

Contact: Mr Edmund G Yu, Controller

333618 Manufactures internal combustion engines; wholesales new motor vehicle parts & supplies

Dana Corp

100 Plumley Dr Bldg 12

Paris, TN 38242

Phone: 731-642-5582 Employees: 650

Contact: Ms Prescilla Lemons, Vice President

326291 Manufactures rubber products for mechanic use

Davidson Hotel Co LLC

3340 Players Club Pkwy Ste 200

Memphis, TN 38125

Phone: 901-761-4664 Employees: 4000

Contact: Mr Glenn Summers, Manager

721110 Hotel

Dbj Enterprises Inc

PO Box 2428

Cleveland, TN 37320

Phone: 423-478-0003 Employees: 525

Contact: Ms Doris Johnson, President

722211 Limited service fast-food chain restaurant

Deloitte & Touche LLP

4022 Sells Dr

Hermitage, TN 37076

Phone: 615-882-7600 Employees: 1000

Contact: Mr Thomas Ratz, Corp Secy

541219 Accounting, auditing & bookkeeping services

Denso Manufacturing Athens Tennessee

2400 Denso Dr

Athens, TN 37303

Phone: 423-746-0000 Employees: 890

Contact: Mr Mark Hori, CEO

336322 Manufactures automotive alternators

Denso Manufacturing Tennessee Inc

1720 Robert C Jackson Dr

Maryville, TN 37801

Phone: 865-982-7000 Employees: 2200

Contact: Masahiko Hattori, President

336322 Manufactures automotive alternators;
manufactures motor vehicle electrical
equipment

Deroyal Industries Inc

1601 State Highway 33

Tazewell, TN 37879

Phone: 423-626-2269 Employees: 500

Contact: Mr Gary Burchett, Vice President

339112 Manufactures medical diagnostic equipment

Deroyal Industries Inc

1601 Highway 33 S

New Tazewell, TN 37825

Phone: 423-626-8858 Employees: 700

Contact: Ms Rebecca Livesay, Manager

339113 Manufactures surgical appliances & supplies

Devlbiss Air Power Co

213 Industrial Dr

Jackson, TN 38301

Phone: 731-423-7000 Employees: 870

Contact: Mr Tom Dewitt, President

333912 Manufactures air & gas compressors;
manufactures high pressure cleaning
equipment; manufactures electric motor &
generator parts

Dmc-Memphis Inc

3000 Getwell Rd

Memphis, TN 38118

Phone: 901-369-8100 Employees: 540

Contact: Gene J Faile, CEO

622110 Medical hospital

Dollar General Corp

100 Mission Rdg

Goodlettsville, TN 37072

Phone: 615-855-4000 Employees: 700

Contact: Mr David L Bere, President

452990 Variety store

Eagle Bend Mfg Inc

1000 Jd Yarnell Ind Pkwy

Clinton, TN 37716

Phone: 865-457-3800 Employees: 600

Contact: Mr Bill Jones, General Manager

336399 Manufactures motor vehicle parts &
accessories; manufactures stamped
automotive products

East Tennessee Baptist Hospital

137 E Blount Ave

Knoxville, TN 37920

Phone: 865-632-5011 Employees: 2000

Contact: Dale Collins, President

622110 Medical hospital

East Tennessee Childrens Hospital Association Inc

PO Box 15010

Knoxville, TN 37901

Phone: 865-541-8000 Employees: 1200

Contact: Mr Robert Koppel, President

622110 Children's hospital

Eastman Chemical Co Inc

PO Box 511

Kingsport, TN 37662

Phone: 423-229-2000 Employees: 10000

Contact: Brian J Ferguson, CEO

325211 Manufactures plastics materials & resins;
manufactures cyclic crudes & intermediates;
manufactures industrial organic chemicals;
manufactures cellulosic manmade fiber
products

**Electric Power Board of The Metropolitan
Government of Nashville & Davidson**

1214 Church St

Nashville, TN 37246

Phone: 615-747-3831 Employees: 700

Contact: Decosta Jenkins, President

221112 Generates fossil fuel electric power

Emerson Electric Co

669 Natchez Trace Dr

Lexington, TN 38351

Phone: 731-967-3000 Employees: 600

Contact: Mr David Gray, Controller

335312 Manufactures electric motors; wholesales
electric motors

England Inc

402 Old Knoxville Hwy

New Tazewell, TN 37825

Phone: 423-626-5211 Employees: 1450

Contact: Mr Rodney England, President

337121 Manufactures upholstered household furniture

Enterprise Electric LLC

1300 Fort Negley Blvd

Nashville, TN 37203

Phone: 615-350-7270 Employees: 500

Contact: Mr Steven J Kirby, Member

238210 Electrical contractor

ePerformax Inc

8001 Centerview Pkwy Fl 3

Cordova, TN 38018

Phone: 901-751-4800 Employees: 550

Contact: Ms Teresa Hartsaw, President

561422 Telemarketing services; marketing consultin
service

Federal Express Corp

PO Box 727

Memphis, TN 38101

Phone: 901-369-3600 Employees: 1000

Contact: Mr David Dromczek, President

492110 Provides private air letter delivery services;
delivery services by vehicle; over the road
trucking; air freight service

Federal Express Corp

40 Fed Ex Pkwy

Collierville, TN 38017

Phone: 901-263-7104 Employees: 1500

Contact: Not Available

492110 Provides private air package delivery
services; ground courier services

Federal Express Corp

PO Box 727

Memphis, TN 38194

Phone: 901-224-5075 Employees: 3000

Contact: Mr Ted Weise, Manager

481112 Air freight service

Federal Express Corp

PO Box 727

Memphis, TN 38194

Phone: 901-369-3600 Employees: 3000

Contact: Mr Frederick W Smith, Ch of Bd

492110 Provides private air package delivery
services; over the road trucking; package
delivery services by vehicle; air freight serv

Federal-Mogul Corp

1 Grizzly Ln

Smithville, TN 37166

Phone: 615-597-6700 Employees: 900

Contact: Mr Darel Callis, Branch Manager

339991 Manufactures gaskets & sealing devices

Federal-Mogul Fap Inc

1 Grizzly Ln
Smithville, TN 37166
Phone: 615-597-6700 Employees: 600
Contact: Mr Richard Newson, President
336399 Manufactures motor vehicle parts & accessories

Fedex Corp

942 S Shady Grove Rd
Memphis, TN 38120
Phone: 901-818-7500 Employees: 1600
Contact: Mr Frederick W Smith, President
492110 Provides private air package delivery services; over the road trucking; package delivery services by vehicle; photocopying & duplicating services; air freight service

Fiberweb Inc

1000 Industrial Rd
Old Hickory, TN 37138
Phone: 615-847-7000 Employees: 500
Contact: Mr Dean Gaskins, President
313111 Manufactures spun polyester yarn

First Horizon National Corp

165 Madison Ave
Memphis, TN 38103
Phone: 901-523-4444 Employees: 633
Contact: Mr Michael D Rose, Ch of Bd
522110 National commercial bank; mortgage banking service; financial service

First Tennessee Bank National Association

PO Box 84
Memphis, TN 38101
Phone: 901-523-4444 Employees: 1000
Contact: Kenneth J Glass, President
522110 National commercial bank; mortgage brokers service, using own money

Fisher & Co Inc

Highway 13 S
Linden, TN 37096
Phone: 931-589-2195 Employees: 644
Contact: Mr Tim Tabor, Branch Manager
336399 Manufactures motor vehicle parts & accessories; retails automotive parts

Five Rivers Electronic Innovations LLC

PO Box 1830
Greeneville, TN 37744
Phone: 423-636-5100 Employees: 700
Contact: Mr Gary Greenway, Vice President
334310 Manufactures television sets

Fleetgaord International Corp

PO Box 6001
Cookeville, TN 38502
Phone: 931-526-9551 Employees: 1100
Contact: Mr Vernon Wilson, Manager
333412 Manufactures blowers & fans; manufactures motor vehicle parts & accessories

Flextronics Logistics USA Inc

5200 Tradeport Dr
Memphis, TN 38141
Phone: 901-215-2700 Employees: 1300
Contact: Mr Michael McNamara, Principal
488991 Packing goods for shipping

Flextronics Semiconductor Design Inc

6380 E Holmes Rd
Memphis, TN 38141
Phone: 901-379-2300 Employees: 500
Contact: Mr Raymond Degraas, Manager
561110 Administrative management services

Food Lion LLC

2453 Murfreesboro Pike
Nashville, TN 37217
Phone: 615-399-1707 Employees: 1000
Contact: Mr Charles George, Manager
445110 Retail supermarket chain

Fort Sanders Regional Medical Center

1901 W Clinch Ave
Knoxville, TN 37916
Phone: 865-541-1111 Employees: 1500
Contact: Mr Keith Altshuler, President
622110 Hospital with professional nursing school

Fred's Inc

PO Box 18356
Memphis, TN 38181
Phone: 901-365-8880 Employees: 1035
Contact: Mr Michael J Hayes, CEO
452990 Variety store; wholesales variety store
merchandise; drug store

Fred's Stores of Tennessee Inc

4300 New Getwell Rd
Memphis, TN 38118
Phone: 901-365-8880 Employees: 600
Contact: Mr Michael J Hayes, CEO
452990 Variety store

Frucon Construction Corp

PO Box 1568
Jackson, TN 38302
Phone: 731-423-7162 Employees: 500
Contact: Mr Joe Peitre, Owner
236116 Residential construction

Galen Health Care Inc

1 Park Plz
Nashville, TN 37203
Phone: 615-344-9551 Employees: 800
Contact: Mr Sam Hazen, President
622110 Medical hospital

Gap Inc

100 Gap Blvd
Gallatin, TN 37066
Phone: 615-230-2300 Employees: 1000
Contact: Mr Gregg Mitchell, Manager
493190 Warehousing & storage facility; wholesales
men's & boys' clothing; wholesales women's
& children's clothing

Gateway Health System Inc

PO Box 3160
Clarksville, TN 37043
Phone: 931-645-3976 Employees: 1000
Contact: Mr Walton Smith Jr, Ch of Bd
622110 Medical hospital

Gaylord Entertainment Co

1 Gaylord Dr
Nashville, TN 37214
Phone: 615-316-6000 Employees: 3622
Contact: Mr Colin V Reed V, President
721110 Traveler accommodations; radio
broadcasting stations with a country music
format; business support services

Gaylord Opryland USA Inc

2802 Opryland Dr
Nashville, TN 37214
Phone: 615-889-6600 Employees: 4000
Contact: Mr Edward L Gaylord, Ch of Bd
713110 Theme park

Gca Services Group Inc

4710 Western Ave
Knoxville, TN 37921
Phone: 865-588-8063 Employees: 3500
Contact: Mr Buddy Helton, Principal
561720 Building & office cleaning service

General Mills Inc

PO Box 129
Murfreesboro, TN 37133
Phone: 615-890-9900 Employees: 700
Contact: Pat Murphy, Plant Manager
311211 Manufactures flour & other grain mill
products; manufactures frozen bakery
products; manufactures food preparations

Gillette Co

PO Box 3390
Cleveland, TN 37320
Phone: 423-478-6000 Employees: 800
Contact: Ms Tammy Williams-Man, Exec Officer
335912 Manufactures dry cell batteries

Goodman Manufacturing Co, LP

1810 Wilson Pkwy

Fayetteville, TN 37334

Phone: 931-433-6101 Employees: 1100

Contact: Ms Karen Counts, Manager

333415 Manufactures complete domestic or industrial
air conditioning units; manufactures
household electric ranges; manufactures
household trash compactors; manufactures
heating equipment & supplies

Goody's Family Clothing Inc

PO Box 22000

Knoxville, TN 37933

Phone: 865-966-2000 Employees: 641

Contact: Mr Isaac Dabah, Ch of Bd

448140 Retail family clothing

Greenbank

100 N Main St

Greeneville, TN 37743

Phone: 423-639-5111 Employees: 500

Contact: Mr Stan R Puckett, President

522110 State commercial bank

Haggar Clothing Co

1645 Parkway Ste 460

Sevierville, TN 37862

Phone: 865-428-3050 Employees: 500

Contact: Mr Joe Hagger III, CEO

448140 Retail family clothing

Hamilton County Department of Education

2501 Dodds Ave

Chattanooga, TN 37407

Phone: 423-209-5650 Employees: 570

Contact: Ms Lana Elliot, Director

923130 Human resource, social work & welfare
administration services; direct sales food
service

Hardin's-Sysco Food Services LLC

4359 Bf Goodrich Blvd

Memphis, TN 38118

Phone: 901-795-2300 Employees: 600

Contact: Mr Peter Scatamacchia, President

424410 Wholesales general line groceries;
wholesales packaged frozen meats;
wholesales medical equipment & supplies;
wholesales fresh meat; wholesales fresh
vegetables; wholesales industrial & persona
serv

Harton, John W Regional Medical Center Inc

1801 N Jackson St

Tulahoma, TN 37388

Phone: 931-393-3000 Employees: 500

Contact: Mr Robert Bigley, CEO

622110 Medical hospital

Haven Behavioral Healthcare Inc

330 Mallory Station Rd B4

Franklin, TN 37067

Phone: 615-206-7720 Employees: 1000

Contact: Mr Vernon Westrich, President

621112 Psychiatrist office

Haywood Corp

751 N Dupree Ave

Brownsville, TN 38012

Phone: 731-772-3690 Employees: 700

Contact: Mr Jonathan Fain, President

326220 Manufactures rubber & plastic hoses &
beltings

HCA Inc

100 Northcrest Dr

Springfield, TN 37172

Phone: 615-384-2411 Employees: 650

Contact: Mr Scott Raynas, Manager

622110 Medical hospital

HCA Information Services Inc

2555 Park Plz

Nashville, TN 37203

Phone: 615-344-9551 Employees: 1100

Contact: Noel Williams, President

518210 Data processing & preparation services

Hca-Hospital Corp of America Inc

1 Park Plz
Nashville, TN 37203
Phone: 615-327-9551 Employees: 800
Contact: Mr Thomas F Frist Jr, Ch of Bd
622110 Medical hospital; psychiatric hospital

Henry County Medical Center

PO Box 1030
Paris, TN 38242
Phone: 731-642-1220 Employees: 500
Contact: Ms Elaine Hodge, Corp Secy
622110 Medical hospital; skilled nursing care facility

Herschend Family Entertainment Corp

1020 Dollywood Ln
Pigeon Forge, TN 37863
Phone: 865-428-9422 Employees: 2500
Contact: Mr Ken Bell, Branch Manager
713990 Amusement concession services

Hershey Co

PO Box 2038
Memphis, TN 38101
Phone: 901-775-2960 Employees: 555
Contact: Mr Mike Clements, Prdtn Mgr
311340 Manufactures chewing gum; wholesales
chewing gum; manufactures candy & other
confectionery products

Hillcrest Medical Nursing Institute Inc

PO Box 59040
Knoxville, TN 37950
Phone: 865-687-1321 Employees: 500
Contact: Ms Teresa Webster, CEO
623110 Intermediate care facility; skilled nursing care
facility

Hilton Hhonors Worldwide LLC

755 Crossover Ln
Memphis, TN 38117
Phone: 901-374-5000 Employees: 500
Contact: Not Available
561499 Business support services

Hospital Corp of America

PO Box 550
Nashville, TN 37202
Phone: 615-344-9551 Employees: 800
Contact: Mr Thomas F Frist Jr, CEO
622110 Medical hospital; psychiatric hospital

Hotel Peabody, LP

149 Union Ave
Memphis, TN 38103
Phone: 901-529-4000 Employees: 500
Contact: Mr Jack A Belz, Partner
721110 Hotel

Idleaire Technologies Corp

410 N Cedar Bluff Rd
Knoxville, TN 37923
Phone: 865-342-3600 Employees: 542
Contact: Mr Michael Crabtree, President
336211 Manufactures specialty motor vehicle bodies
manufactures refrigeration & heating
equipment

Impact Logistics Inc

7200 Goodlett Farms Pkwy
Cordova, TN 38016
Phone: 901-377-5298 Employees: 1100
Contact: Mr David Hamilton, CEO
561320 Help supply services

Imperial Guard & Detective Services Inc

2555 Poplar Ave
Memphis, TN 38112
Phone: 901-726-6636 Employees: 900
Contact: R Q Brewer, President
561611 Detective agency

Indian Path Hospital Inc

2000 Brookside Dr
Kingsport, TN 37660
Phone: 423-857-7000 Employees: 585
Contact: Mr Martin McLorain, CEO
622110 Medical hospital

Ingram Book Group Inc

1 Ingram Blvd
 La Vergne, TN 37086
 Phone: 615-213-5000 Employees: 2048
 Contact: Mr James E Chandler, President
 424920 Wholesales books, periodicals & newspapers

International Paper Co

6400 Poplar Ave
 Memphis, TN 38197
 Phone: 901-419-7000 Employees: 3000
 Contact: Mr John V Faraci V, CEO
 322121 Paper mill; manufactures corrugated boxes;
 manufactures container, packaging &
 boxboard; manufactures liquid tight food
 containers including milk containers;
 manufactures coated & laminated paper; pu

International Paper Co

4113 Willow Lake Blvd
 Memphis, TN 38118
 Phone: 901-419-9000 Employees: 3000
 Contact: Not Available
 322121 Paper mill

International Rehabilitation Associates Inc

PO Box 1465
 Nashville, TN 37202
 Phone: 615-244-5600 Employees: 900
 Contact: Mr Bryan Sethzer, Vice President
 524114 Health insurance maintenance organization

Jackson Hospital Corp

367 Hospital Blvd
 Jackson, TN 38305
 Phone: 731-661-2000 Employees: 550
 Contact: Mr Tim Puthoff, CEO
 622110 Medical hospital

Jackson-Madison County General Hospital

708 W Forest Ave
 Jackson, TN 38301
 Phone: 731-425-5000 Employees: 3193
 Contact: Mr Bruce Belebsoe, Ch of Bd
 622110 Medical hospital

Jacobs Technology Inc

877 Avenue E
 Arnold AFB, TN 37389
 Phone: 931-454-3000 Employees: 1300
 Contact: Mr Roger Star, General Manager
 541330 Engineering services; testing laboratory

Johnson City Medical Center Inc

400 N State Of Franklin Rd
 Johnson City, TN 37604
 Phone: 423-431-6111 Employees: 2080
 Contact: Ms Diane Stine, Corp Secy
 622110 Medical hospital

Johnson Controls Interiors LLC

1501 S Molloy Ln
 Murfreesboro, TN 37129
 Phone: 615-890-5559 Employees: 657
 Contact: Mr Gerald Curry, Plant Manager
 336360 Manufactures automobile seats

Johnson Controls Interiors LLC

659 Natchez Trace Dr
 Lexington, TN 38351
 Phone: 731-968-3601 Employees: 630
 Contact: Mr Jed Curry, Exec Officer
 336399 Manufactures motor vehicle parts &
 accessories; manufactures institutional
 furniture

Johnson Controls Interiors LLC

PO Box 989
 Athens, TN 37371
 Phone: 423-745-5807 Employees: 700
 Contact: Mr Chris Brauss, Plant Manager
 336360 Manufactures automobile seats

Jones Bros Inc

PO Box 727
 Mount Juliet, TN 37121
 Phone: 615-754-4710 Employees: 1000
 Contact: Mr Robert A Jones, Ch of Bd
 237310 Bridge construction; general highway & street
 construction service; irrigation land leveling
 service; driveway, parking lot & blacktop
 contractor; excavation & grading, building
 construction contract

Jostens Inc

PO Box 923
Clarksville, TN 37041
Phone: 931-647-5211 Employees: 500
Contact: Mr David Dunlap, Controller
511199 Atlas, map & guide publishing; book printer;
book publisher

Jtekt Automotive Tennessee-Morristown Inc

5932 Commerce Blvd
Morristown, TN 37814
Phone: 423-585-0999 Employees: 545
Contact: Mr Ike Funahashi, Ch of Bd
336330 Manufactures motor vehicle power steering
equipment

Jtekt Automotive Tennessee-Vonore Co

55 Excellence Way
Vonore, TN 37885
Phone: 423-884-9200 Employees: 780
Contact: Mr Michael Bowers, Partner
326199 Manufactures plastic automotive parts

Kayser-Roth Corp

220 Broadway St
Dayton, TN 37321
Phone: 423-775-1551 Employees: 503
Contact: Mr Steve Wimberly, Manager
315111 Dyeing & finishing women's full & knee length
hosiery

Kellogg Co

2168 Frisco Ave
Memphis, TN 38114
Phone: 901-743-0250 Employees: 750
Contact: Lee Romine, Corp Secy
311230 Manufactures cereals

Kellwood Co Inc

208 N Sportwear Division
Rutherford, TN 38369
Phone: 731-665-6511 Employees: 500
Contact: Mr Enoch Harding, Division Pres
315234 Manufactures women's, misses' & juniors'
suits & coats; manufactures men's & boys'
coats & suits; manufactures women's &
misses' outerwear

Kenco Logistic Services Inc

PO Box 1607
Chattanooga, TN 37401
Phone: 423-756-5552 Employees: 2500
Contact: Mr James D Kennedy III, Ch of Bd
531130 Self storage warehousing; crating goods for
shipping

Kimberly-Clark Corp

PO Box 59051
Knoxville, TN 37950
Phone: 865-541-7000 Employees: 600
Contact: Mr James E Lopas, Principal
322121 Paper mill

King Industries Inc

PO Box 16608
Chattanooga, TN 37416
Phone: 423-622-4500 Employees: 550
Contact: Mr Bill King, President
238220 Mechanical contractor

Knoxville News-Sentinel Co

PO Box 59038
Knoxville, TN 37950
Phone: 865-523-3131 Employees: 580
Contact: Mr Bruce Hartmann, President
511110 Publishes & prints newspapers

Kordsa Inc

PO Box 599
Hixson, TN 37343
Phone: 423-643-8300 Employees: 600
Contact: Dincer Celik, President
313111 Manufactures spun staple nylon yarn

Landair Transport Inc

PO Box 938
Greeneville, TN 37744
Phone: 423-783-1300 Employees: 761
Contact: Mr Scott M Niswonger, CEO
484121 Over the road trucking

Laughlin Memorial Hospital Inc

1420 Tusculum Blvd

Greeneville, TN 37745

Phone: 423-787-5000 Employees: 500

Contact: Mr Charles H Whitfield Jr, CEO

622110 Medical hospital; skilled nursing care facility

La-Z-Boy Inc

PO Box 457

Dayton, TN 37321

Phone: 423-775-3900 Employees: 500

Contact: Mr David Brown, CEO

337121 Manufactures upholstered household furniture; wholesales chairs

Lebanon Hma Inc

1411 W Baddour Pkwy

Lebanon, TN 37087

Phone: 615-444-8262 Employees: 500

Contact: Vins Cherry, CEO

622110 Medical hospital

Lee Co

331 Mallory Station Rd

Franklin, TN 37067

Phone: 615-567-1000 Employees: 600

Contact: Mr William B Lee, CEO

238220 Plumbing service

Lifeway Christian Resources of The Southern Baptist Convention

1 Lifeway Plz

Nashville, TN 37234

Phone: 615-251-2000 Employees: 2000

Contact: Mr Ken Stephens, President

451211 Retailers religious books; retailers compact discs; retail gift shop; retailers religious goods; direct selling establishment; book publisher

Mahle Metal Leve

PO Box 748

Morristown, TN 37815

Phone: 423-581-6603 Employees: 1300

Contact: Not Available

336399 Manufactures motor vehicle parts & accessories; manufactures carburetors, pistons, piston rings & valves

Manheim Auctions Inc

1450 Lebanon Pike

Nashville, TN 37210

Phone: 615-244-2140 Employees: 600

Contact: Robin Treadway, Manager

423110 Automobile auction services

Manufacturers Industrial Group

PO Box 1048

Lexington, TN 38351

Phone: 731-967-0001 Employees: 900

Contact: Mr Andre Gist, Member

332999 Manufactures metal automotive seat frames manufactures institutional furniture

Mars Snackfood Us LLC

3500 Peerless Rd NW

Cleveland, TN 37312

Phone: 423-479-8611 Employees: 678

Contact: Mr George Linden, Persnl Mgr

311340 Manufactures candy & other confectionery products; manufactures chocolate & cocoa products

Marvin Windows of Tennessee Inc

101 Marvin Dr

Ripley, TN 38063

Phone: 731-635-5190 Employees: 700

Contact: Mr John W Marvin, CEO

321911 Manufactures wooden doors; manufactures glass doors

Maury Regional Hospital Inc

1224 Trotwood Ave

Columbia, TN 38401

Phone: 931-381-1111 Employees: 2000

Contact: Mr Robert Otwell, CEO

622110 Medical hospital

Mayfield Dairy Farms LLC

PO Box 310

Athens, TN 37371

Phone: 423-745-2151 Employees: 525

Contact: Scott C Mayfield Jr, President

311511 Processes, pasteurizes, homogenizes & bottles milk; manufactures frozen ice cream novelties

Maytag Corp

PO Box 2790
Cleveland, TN 37320
Phone: 423-472-3371 Employees: 2500
Contact: Mr Tom Chatman, VP Operations
335221 Manufactures indoor cooking equipment

Maytag Corp

2500 Dr F E Wright Dr
Jackson, TN 38305
Phone: 731-424-3500 Employees: 600
Contact: Ms Janice Page, Manager
335228 Manufactures household dishwashing
machines

McKee Foods Corp

PO Box 750
Collegedale, TN 37315
Phone: 423-238-7111 Employees: 3795
Contact: Mr Mike M Kee, President
311812 Manufactures fresh bakery cakes;
manufactures cookies; manufactures food
preparations; manufactures cereals

Memphis Publishing Co

495 Union Ave
Memphis, TN 38103
Phone: 901-529-2211 Employees: 750
Contact: Mr Joseph Pepe, President
511110 Publishes & prints newspapers

Meridian Comp of New York

20 Burton Hills Blvd 20
Nashville, TN 37215
Phone: 615-665-7538 Employees: 553
Contact: Mr Haywood Cochrane, CEO
621111 Mental health physicians' office & clinic

Methodist Healthcare Memphis Hosp

1265 Union Ave
Memphis, TN 38104
Phone: 901-516-7000 Employees: 2600
Contact: Mr Cameron J Welton, President
622110 Hospital with AMA approved residency

Methodist Medical Center of Oak Ridge Inc

PO Box 2529
Oak Ridge, TN 37831
Phone: 865-835-4000 Employees: 1442
Contact: Jan McNally, President
622110 Medical hospital

Metropolitan Government of Nashville & Davidson County

1414 County Hospital Rd
Nashville, TN 37218
Phone: 615-862-7000 Employees: 562
Contact: Jn Henderson, Finance Spvr
623311 Convalescent home; county supervisors' &
executives' office

Metropolitan Government of Nashville & Davidson County

72 Hermitage Ave
Nashville, TN 37210
Phone: 615-862-4150 Employees: 692
Contact: Mr John M Stone, Director
622110 Medical hospital; county government
administration of public health programs

Metropolitan Government of Nashville & Davidson County

750 S 5th St
Nashville, TN 37206
Phone: 615-862-8700 Employees: 542
Contact: Ms Millie Carman, Manager
562212 Garbage collecting, destroying & processing
services; government public utility
commission

Metropolitan Government of Nashville & Davidson County

621 Mainstream Dr
Nashville, TN 37228
Phone: 615-862-4500 Employees: 643
Contact: Mr Lester Williams, Branch Manager
221310 Water supply services; government waste
management program administration office

Metropolitan Government of Nashville & Davidson County

511 Oman St
Nashville, TN 37203
Phone: 615-862-8400 Employees: 500
Contact: Mr Roy Wilson, Director
713990 Recreation services; county government
urban & community development

Metropolitan Government of Nashville & Davidson County

1818 Albion St
Nashville, TN 37208
Phone: 615-341-4403 Employees: 650
Contact: Mr Reginald Coopwood, CEO
622110 Medical hospital; county government
administration of public health programs

MI Windows & Doors Inc

704 12th St
Smyrna, TN 37167
Phone: 615-459-4161 Employees: 500
Contact: Mr David Kelley, General Manager
332321 Manufactures metal doors, sash & trim;
millwork

Michael Moulton Telephone

333 Commerce St
Nashville, TN 37201
Phone: 615-214-5916 Employees: 1700
Contact: Mr Michael Moulton, Manager
517911 Wired telecommunications carrier & service

Middle Tennessee Medical Center

PO Box 1178
Murfreesboro, TN 37133
Phone: 615-396-4100 Employees: 1000
Contact: Mr Gordon B Ferguson, CEO
622110 Medical hospital

Monitor Systems Inc

2521 Russell St Ste C
Kingsport, TN 37660
Phone: 423-247-5300 Employees: 580
Contact: Mr Tom Hammons, President
722211 Limited service fast-food chain restaurant

Morgan Keegan & Co Inc

50 N Front St
Memphis, TN 38103
Phone: 901-524-4100 Employees: 900
Contact: Mr Allen B Morgan Jr, Ch of Bd
523120 Security broker service

Morristown-Hamblen Hospital Association

PO Box 1178
Morristown, TN 37816
Phone: 423-586-4231 Employees: 600
Contact: Mr Richard Clark, President
622110 Hospital, affiliated with AMA residency

Mountain State Health Alliance Inc

400 N State Of Franklin Rd
Johnson City, TN 37604
Phone: 423-431-6360 Employees: 1200
Contact: Mr Dennis Vonderfecht, President
622110 Medical hospital; management services

MTD Products Inc

PO Box 927
Martin, TN 38237
Phone: 731-587-4279 Employees: 650
Contact: Mr Steve Baker, Mfg Spvr
333112 Manufactures residential hand or power
lawnmowers; manufactures motor vehicle
frames

M-Tek Inc

1020 Volunteer Pkwy
Manchester, TN 37355
Phone: 931-728-4122 Employees: 1317
Contact: Susumu Okada, Corp Secy
326199 Manufactures finished injection molded
plastic products; manufactures motor vehicle
parts & accessories; manufactures hardware

Mueller Co Ltd

1401 Mueller Ave
Chattanooga, TN 37406
Phone: 423-698-8811 Employees: 550
Contact: Mr Trey Elmendors, Exec Officer
332911 Manufactures fire hydrant valves; malleable
iron foundry; manufactures industrial proces
flow instruments

National Seating Co

200 National Dr
Vonore, TN 37885
Phone: 423-884-6651 Employees: 740
Contact: Mr Vernon Lowe, President
337127 Manufactures transportation seats

Newell Office Products Inc

1427 William Blount Dr
Maryville, TN 37801
Phone: 865-977-5477 Employees: 600
Contact: Mr David Klatt, President
337214 Manufactures office furniture; manufactures
partitions & fixtures

Newell Rubbermaid Inc

1427 William Blount Dr
Maryville, TN 37801
Phone: 865-977-5428 Employees: 500
Contact: Mr Brian Rhoades, Manager
493110 Warehousing & storage services

Nhc Op LP

PO Box 1398
Murfreesboro, TN 37133
Phone: 615-890-2020 Employees: 500
Contact: Andrew W Adams, President
623110 Skilled nursing care facility

Nissan Motor Acceptance Corp

333 Commerce St
Nashville, TN 37201
Phone: 615-725-1655 Employees: 670
Contact: Mr Steve Lambert, President
522291 Personal automobiles & furniture financing

Nissan North America Inc

983 Nissan Dr
Smyrna, TN 37167
Phone: 615-459-1400 Employees: 6000
Contact: Mr Bill Krueger, VP Operations
336111 Manufactures automobiles

Nissan North America Inc

PO Box 685001
Franklin, TN 37068
Phone: 615-725-1000 Employees: 2500
Contact: Mr Carlos Ghosn, President
423110 Wholesales commercial vehicles; assemble;
complete automobiles including specialty;
personal automobiles & furniture financing;
ship, boat, machine & product design
services; product testing laborato

Nissan North America Inc

PO Box 272
Decherd, TN 37324
Phone: 931-962-5000 Employees: 2000
Contact: Mr Charles D Cooper Jr, Plant Manager
441110 Retailers new & used automobiles;
manufactures motor vehicle parts &
accessories

Nissan North America Inc

610 Enon Springs Rd E
Smyrna, TN 37167
Phone: 615-355-2000 Employees: 1000
Contact: Mr Rick Jackson, Manager
423110 Automotive brokers

NorthCrest Medical Center

100 Northcrest Dr
Springfield, TN 37172
Phone: 615-384-2411 Employees: 500
Contact: Ms Judy Cole, Corp Secy
622110 Medical hospital

Northwest Airlines Inc

2491 Winchester Rd Ste 203
Memphis, TN 38116
Phone: 901-922-8480 Employees: 500
Contact: Mr Steve Holme, Manager
481111 Passenger airline services

Nu-Foam Products Inc

PO Box 5648
Chattanooga, TN 37406
Phone: 423-698-6911 Employees: 1200
Contact: Mr Charles L Moeller, President
326150 Manufactures plastic foam products

Oak Ridge Associated Universities Inc

PO Box 117

Oak Ridge, TN 37831

Phone: 865-576-3000 Employees: 500

Contact: Mr Ronald D Townsend, President
541712 Scientific research agency

Olan Mills Inc

PO Box 23456

Chattanooga, TN 37422

Phone: 423-622-5141 Employees: 600

Contact: Olan Mills II, Ch of Bd

541921 Still or video photographer; commercial
lithographic printing

Old Dominion Freight Line Inc

308 Roy Messer Hwy

White Pine, TN 37890

Phone: 865-674-6151 Employees: 900

Contact: Mr John Eberling, CEO

484121 Over the road trucking

Orange Grove Center Inc

615 Derby St

Chattanooga, TN 37404

Phone: 423-629-1451 Employees: 680

Contact: Ms Carla Cooper, Human Res Dir

624310 Vocational training agency

Ozark Motor Lines Inc

PO Box 181077

Memphis, TN 38181

Phone: 901-251-9711 Employees: 725

Contact: Mr Michael E Hopper, CEO

484121 Over the road trucking

Paccar Inc

PO Box 487

Madison, TN 37116

Phone: 615-865-8910 Employees: 1100

Contact: Mr Joe Scattergood, Plant Manager

333924 Manufactures industrial trucks & tractors

Parkridge Hospital Inc

2333 McCallie Ave

Chattanooga, TN 37404

Phone: 423-698-6061 Employees: 785

Contact: Mr Jeff Fee, CEO

622110 Medical hospital

Parkwest Medical Center

PO Box 22993

Knoxville, TN 37933

Phone: 865-373-1000 Employees: 1100

Contact: Ms Barbara Blevins, Chief

622110 Medical hospital

Perkins & Marie Callender's Holding Inc

PO Box 17126

Memphis, TN 38187

Phone: 901-766-6400 Employees: 850

Contact: Mr Joseph Trungale, CEO

722110 Full service chain family restaurant

Pictsweet LLC

PO Box 119

Bells, TN 38006

Phone: 731-422-7600 Employees: 1000

Contact: Toby Leigh, Director

311411 Manufactures quick frozen & cold pack
vegetables; mushroom farming; over the
road trucking; vegetable & melon farm

Pilgrim's Pride Corp

PO Box 991

Chattanooga, TN 37401

Phone: 423-756-2471 Employees: 800

Contact: Mr Rodney Walker, Principal

311615 Poultry slaughtering & processing

Pinnacle Airlines Corp

1689 Nonconnah Blvd Ste 111

Memphis, TN 38132

Phone: 901-348-4100 Employees: 1010

Contact: Mr Donald Breeding, Ch of Bd

481111 Passenger airline services

Pinnacle Foods Group Inc

PO Box 2688

Jackson, TN 38302

Phone: 731-426-6200 Employees: 500

Contact: Mr Henry Higgs, Controller

311813 Manufactures frozen bakery products; fresh
or frozen fish & seafood processing;
manufactures food preparations;
manufactures frozen food products

Plus Mark Inc

PO Box 549

Greeneville, TN 37744

Phone: 423-636-2118 Employees: 900

Contact: Mr Bob Hartman, Vice President

322221 Manufactures waterproof or coated wrapping
paper

Porter-Cable Corp

PO Box 2468

Jackson, TN 38302

Phone: 731-668-8600 Employees: 1000

Contact: Mr Charles M Brown, President

333991 Manufactures power hand tools

Primus Automotive Financial Services Inc

PO Box 680020

Franklin, TN 37068

Phone: 615-315-7900 Employees: 1700

Contact: Mr Andy Menzyk, President

522291 Personal automobile loans, including
insurance

Priority Fulfillment Services Inc

4650 E Shelby Dr

Memphis, TN 38118

Phone: 901-795-8441 Employees: 650

Contact: Mr Scott Talley, Manager

561110 Management services

Procter & Gamble Manufacturing Co

PO Box 2104

Jackson, TN 38302

Phone: 731-423-7100 Employees: 1100

Contact: Mr Derek Easton, Plant Manager

311919 Manufactures potato chips & other potato-
based snacks

Progressive Communication Services Inc

3618 Old Hickory Blvd

Old Hickory, TN 37138

Phone: 615-847-3302 Employees: 750

Contact: Ms Annette Pilote, President

541690 Telecommunications consulting services

Prologix Distribution Services LLC

6016 Brookvale Ln 110B

Knoxville, TN 37919

Phone: 865-584-9765 Employees: 2093

Contact: Bo Castle, President

484110 Local trucking without storage services; over
the road trucking

Promus Operating Co Inc

755 Crossover Ln

Memphis, TN 38117

Phone: 901-374-5000 Employees: 1300

Contact: Mr Thomas L Keltner, President

721110 Traveler accommodations; selling or
licensing of franchises; hotel or motel
management services

Propex Inc

PO Box 22788

Chattanooga, TN 37422

Phone: 423-855-1466 Employees: 1800

Contact: Mr Joseph F Dana, President

313210 Manufactures polypropylene broadwoven
fabric; nonwoven fabric mill; broadwoven
cotton fabric mill; manmade, fiber & silk
textile finishing plant

Provident Life & Accident Insurance Co

1 Fountain Sq

Chattanooga, TN 37402

Phone: 423-755-1011 Employees: 1500

Contact: Mr Thomas R Watjen, CEO

524113 Life insurance carrier; direct accident &
health insurance carrier

Psychiatric Solutions Inc

6640 Carothers Pkwy # 500

Franklin, TN 37067

Phone: 615-312-5700 Employees: 1680

Contact: Mr Joey A Jacobs, President

621112 Psychiatric clinic; psychiatric hospital

Quality Industries Inc

PO Box 7016

La Vergne, TN 37086

Phone: 615-793-3000 Employees: 620

Contact: Mr Fred Appel, President

332322 Sheet metal fabricator; manufactures stamped automotive products; manufactures metal stampings

Quebecor World Inc

PO Box 1406

Dyersburg, TN 38025

Phone: 731-286-5555 Employees: 1000

Contact: Ms Susan Dew, Plant Manager

323110 Offset printing; book binding service; book printer; periodical publisher

Quebecor World Inc

451 International Blvd

Clarksville, TN 37040

Phone: 931-553-4400 Employees: 1000

Contact: Mr Greg Bumb, VP Admin

323110 Commercial lithographic printing; book printer; periodical publisher

Quebecor World Inc

4000 Highway 51 N

Covington, TN 38019

Phone: 901-476-0495 Employees: 800

Contact: Mr David Lewis, Plant Manager

511120 Periodical publisher; book printer

R R Donnelley & Sons Co

801 Steam Plant Rd

Gallatin, TN 37066

Phone: 615-452-5170 Employees: 800

Contact: Mr Dennis Wall, Vice President

323110 Offset printing; book binding service; imprinting service; commercial gravure printing

RehabCare Group

3535 Kirby Rd Apt N405

Memphis, TN 38115

Phone: 901-366-1819 Employees: 1000

Contact: Ms Pam Yarboro, Director

621498 Specialty outpatient clinic

Renaissance Hotel Operating Co Inc

611 Commerce St

Nashville, TN 37203

Phone: 615-255-8400 Employees: 500

Contact: Juris Vasilevskis, Controller

721110 Traveler accommodations; eating place; drinking establishment

Roadway Express Inc

3240 Franklin Limestone Rd

Antioch, TN 37013

Phone: 615-331-4701 Employees: 500

Contact: Mr Steve Swarthout, Manager

484121 Over the road trucking; local trucking without storage services

Roadway Express Inc

3310 Gill Rd

Memphis, TN 38109

Phone: 901-348-1600 Employees: 1000

Contact: Mr Chuck Downing, Manager

488490 Freight trucking terminal; local trucking without storage services; over the road trucking

Robert Orr-Sysco Food Services LLC

PO Box 305137

Nashville, TN 37230

Phone: 615-350-7100 Employees: 694

Contact: Mr Gary Kennedy, VP Operations

424420 Wholesales frozen vegetables & fruit products; wholesales cooking oils & shortenings

Saint Francis Hospital

5959 Park Ave

Memphis, TN 38119

Phone: 901-765-1000 Employees: 1700

Contact: Mr Dave Archer, President

622110 Medical hospital; skilled nursing care facility

Sanford, LP

PO Box 470

Shelbyville, TN 37162

Phone: 931-684-4133 Employees: 800

Contact: Mr Howard Broadfoot, Plant Manager

339942 Manufactures lead pencils & art goods; retails writing supplies

Sanitors Southwest of Memphis Inc

3043 Broad Ave
Memphis, TN 38112
Phone: 901-452-3770 Employees: 626
Contact: Mr Ed Walsh, General Manager
561720 Janitorial & custodial services

Sara Lee Corp

2000 Biffle Rd
Newbern, TN 38059
Phone: 731-627-3271 Employees: 850
Contact: Mr Eugene Smith, Plant Manager
424470 Wholesales meat & meat products; meat processing

Saturn Corp

PO Box 1500
Spring Hill, TN 37174
Phone: 931-486-5049 Employees: 7000
Contact: Mr John Palan, Project Manager
336111 Manufactures motor vehicles & car bodies;
manufactures motor vehicle parts & accessories

Science Applications International Corp

PO Box 2501
Oak Ridge, TN 37831
Phone: 865-481-4600 Employees: 577
Contact: Mr George Harper, Program Manager
541712 Commercial physical research services;
manufactures liquid crystal displays;
manufactures cathode ray tube computer terminals

Scripps Networks Inc

9721 Sherrill Blvd
Knoxville, TN 37932
Phone: 865-694-2700 Employees: 800
Contact: Mr John Lansing, President
515210 Pay television distribution

Sea Ray Boats Florida Corp

2601 Sea Ray Dr
Knoxville, TN 37914
Phone: 865-522-4181 Employees: 800
Contact: Ms Cynthia Trudel, President
336612 Builds & repairs fiberglass boats

Sea Ray Boats Inc

2600 Sea Ray Dr
Knoxville, TN 37914
Phone: 865-522-4181 Employees: 3500
Contact: Ms Cynthia Truedell, President
336612 Builds & repairs fiberglass boats; boat deale

Sea Ray Boats Inc

5502 Island River Dr
Knoxville, TN 37914
Phone: 865-637-3607 Employees: 600
Contact: Mr Mike Fritts, Manager
336612 Builds & repairs boats

Sea Ray Boats Inc

2601 Sea Ray Dr
Knoxville, TN 37914
Phone: 865-525-9940 Employees: 900
Contact: Mr Ken Harrell, Manager
336612 Builds & repairs fiberglass boats

ServiceMaster Co

860 Ridge Lake Blvd
Memphis, TN 38120
Phone: 901-597-1400 Employees: 770
Contact: Patrick J Spainhour, CEO
561730 Lawn care services; heating & air conditioning contractor; termite control service; electrical contractor; building cleaning & maintenance services; reupholstery & furniture repair

Seton Corp

2000 Church St
Nashville, TN 37236
Phone: 615-284-6866 Employees: 2900
Contact: Mr Tom Beeman, President
622110 Medical hospital; mental health physicians' office & clinic

Sewell-Allen Inc

5150 American Way
Memphis, TN 38115
Phone: 901-362-3492 Employees: 1100
Contact: Mr Richard James, President
445110 Retail chain grocery store

Sharp Electronics Corp

Sharp Plaza Blvd

Memphis, TN 38193

Phone: 901-795-6510 Employees: 1000

Contact: Mr Hiroshi Kinoshita, VP Operations

334310 Manufactures television sets; wholesales electrical entertainment equipment; manufactures household microwave ovens; photographic equipment & supplies

Sheet Metal Workers International Association

PO Box 18740

Knoxville, TN 37928

Phone: 865-689-2928 Employees: 930

Contact: Mr Grover T Fuller, Manager

813930 Labor organization; sheet metal fabricator

Shelby County Health Care Corp

842 Jefferson Ave

Memphis, TN 38103

Phone: 901-545-7928 Employees: 2000

Contact: Mr Bruce Steinhauer, CEO

622110 Medical hospital

Siegel-Robert Inc

PO Box 233

Ripley, TN 38063

Phone: 731-635-0671 Employees: 625

Contact: Gene Parker, Branch Manager

326130 Manufactures laminated plastics; manufactures motor vehicle parts & accessories; manufactures glass products

Skyline Medical Group LLC

3441 Dickerson Pike

Nashville, TN 37207

Phone: 615-769-2000 Employees: 950

Contact: Ms Barbara Brennen, Exec Officer

622110 Medical hospital

Southern Hills Medical Center

391 Wallace Rd

Nashville, TN 37211

Phone: 615-781-4000 Employees: 650

Contact: Mr Jack Bovender, President

621111 Mental health physicians' office & clinic; medical hospital

Southern Tennessee Medical Center L L C

185 Hospital Rd

Winchester, TN 37398

Phone: 931-967-8200 Employees: 9300

Contact: Lenae King, Principal

622110 Medical hospital

St Jude Hospital

332 N Lauderdale St

Memphis, TN 38105

Phone: 901-495-3300 Employees: 2500

Contact: Mr Douglas Tran, Project Manager

524114 Hospital & medical insurance carrier

Standifer Place LLC

2626 Walker Rd

Chattanooga, TN 37421

Phone: 423-490-1599 Employees: 500

Contact: Mr Don Sagar, Office Manager

623110 Nursing home

State Farm Fire & Casualty Co Inc

2500 Memorial Blvd

Murfreesboro, TN 37129

Phone: 615-898-6000 Employees: 1200

Contact: Mr Ron G Nichols, Manager

524126 Fire, marine & casualty insurance & carriers

Stellar Management Group Inc

4146 S Creek Rd

Chattanooga, TN 37406

Phone: 423-265-7090 Employees: 947

Contact: Mr Thomas Daniels, Manager

423620 Wholesales electric garbage disposals

Stratos Boats Inc

880 Butler Dr

Murfreesboro, TN 37127

Phone: 615-494-2090 Employees: 750

Contact: Mr Clark J Vitulli, President

336612 Builds & repairs small lobster, crab or oyster boats

Summit Medical Center

5655 Frist Blvd
Hermitage, TN 37076
Phone: 615-316-3000 Employees: 1050
Contact: Mr Jeff Whitehorn, CEO
622110 Medical hospital

Sumner Regional Health Systems Inc

555 Hartsville Pike
Gallatin, TN 37066
Phone: 615-452-4210 Employees: 875
Contact: Mr William T Sugg, President
622110 Medical hospital

Sunbeam Products Inc

150 Cadillac Ln
Mc Minnville, TN 37110
Phone: 931-668-4121 Employees: 670
Contact: Mr Gregory Sweeton, Plant Manager
335221 Manufactures major household cooking
appliances; manufactures small electric
household appliances

SunTrust Banks Nashville

PO Box 305110
Nashville, TN 37230
Phone: 615-748-4000 Employees: 1135
Contact: Mr Robert E McNeilly, President
522110 National commercial bank

Technicolor Home Entertainment Services Inc

4155 E Holmes Rd
Memphis, TN 38118
Phone: 901-433-4100 Employees: 3500
Contact: Mr Tom Thoms, Finance Manager
423620 Wholesales video cassette recorders &
accessories; packaging & labeling services

Tecumseh Products Co

PO Box 1329
Dunlap, TN 37327
Phone: 423-949-5470 Employees: 600
Contact: Mr Bruce Bacon, Plant Manager
333618 Manufactures internal combustion engines

Tennessee Department of Human Services

400 Deaderick St Fl 15
Nashville, TN 37243
Phone: 615-313-4700 Employees: 1000
Contact: Mr Rick Brown, CFO
524114 Disability insurance carrier

Tennessee Department of Mental Health & Developmental Disabilities

PO Box 586
Arlington, TN 38002
Phone: 901-745-7200 Employees: 1298
Contact: Mr Leon Owens, Superintendent
622210 Psychiatric hospital; public health program
services; intermediate care facility

Tennessee Department of Mental Health & Developmental Disabilities

5908 Lyons View Pike
Knoxville, TN 37919
Phone: 865-584-1561 Employees: 500
Contact: Dj Smith, Corp Secy
622210 Mental hospital; public health program
services

Tennessee Department of Mental Health & Developmental Disabilities

11100 Highway 64
Bolivar, TN 38008
Phone: 731-228-2000 Employees: 600
Contact: Mr Bob Galloway, Exec Officer
622210 Mental hospital; public health program
services

Tennessee Dept of Health

975 E 3rd St
Chattanooga, TN 37403
Phone: 423-778-7811 Employees: 4000
Contact: Mr Jim Brexler, Manager
622110 Medical hospital; public health program
services

Tennessee Tbdn Co

PO Box 1887

Jackson, TN 38302

Phone: 731-421-4800 Employees: 500

Contact: Tokuji Yamauchi, Partner

336399 Manufactures motor vehicle parts & accessories

Tennessee Valley Authority

400 W Summit Hill Dr

Knoxville, TN 37902

Phone: 865-632-2101 Employees: 1000

Contact: Mr William B Sansom, Ch of Bd

221119 Provides electric power generation services

Tennessee Valley Authority

PO Box 2000

Soddy Daisy, TN 37384

Phone: 423-843-6000 Employees: 3000

Contact: Masoud Bajestani, President

221119 Provides electric power generation services; utilities regulation & administration services

Tennessee Valley Authority

1101 Market St

Chattanooga, TN 37402

Phone: 423-751-8656 Employees: 700

Contact: Mr Joe Bynum, Principal

221119 Electric services; utilities regulation & administration services

Tennessee West Healthcare

708 W Forese T Ave

Jackson, TN 38301

Phone: 731-425-5000 Employees: 2627

Contact: Mr Jim Moss, President

622110 Medical hospital

Tennsco Corp

PO Box 1888

Dickson, TN 37056

Phone: 615-326-0611 Employees: 650

Contact: Mr Roy Stinson, Branch Manager

337214 Manufactures office furniture

Tennsco Corp

PO Box 1888

Dickson, TN 37056

Phone: 615-326-0685 Employees: 650

Contact: Johnnie Morris, Branch Manager

337214 Manufactures office furniture

Thomas & Betts Corp

8155 T And B Blvd

Memphis, TN 38125

Phone: 901-252-8000 Employees: 675

Contact: Mr Dominic J Pileggi, President

335931 Manufactures electric connectors; manufactures steel structural shapes & pilings; manufactures industrial electric heating units & devices

Tom James of New Orleans Inc

263 Seaboard Ln

Franklin, TN 37067

Phone: 615-771-1122 Employees: 1000

Contact: Mr Spencer Rays, President

448110 Retailers men's & boys' clothing; manufacture: men's & boys' coats & suits

Tom James Stores Inc

263 Seaboard Ln

Franklin, TN 37067

Phone: 615-771-1122 Employees: 500

Contact: Mr James M Eachern, Ch of Bd

448110 Retailers men's & boys' clothing

Tri Star Energy LLC

PO Box 282249

Nashville, TN 37228

Phone: 615-313-3600 Employees: 500

Contact: Ms Sherry Taylor, Manager

452990 Variety store

TRW Automotive US LLC

PO Box 250

Lebanon, TN 37088

Phone: 615-444-6110 Employees: 650

Contact: Mr William Wallace, Exec Officer

336330 Manufactures motor vehicle steering mechanisms; manufactures fluid power pumps & motors

TRW Automotive US LLC

2101 W Main St
Rogersville, TN 37857
Phone: 423-272-2171 Employees: 800
Contact: Mr Mike Kelly, General Manager
336350 Manufactures motor vehicle gears;
manufactures iron or steel forgings

TUTCO Inc

500 Gould Dr
Cookeville, TN 38506
Phone: 931-432-4141 Employees: 526
Contact: Mr Patrick McCaffrey, President
335211 Manufactures heating units for electric
appliances

Tyson Foods Inc

PO Box 669
Union City, TN 38281
Phone: 731-886-4700 Employees: 1300
Contact: Mr Keith Riley, Branch Manager
311615 Chicken slaughtering & processing; poultry
hatchery

Tyson Foods Inc

PO Box 8
Shelbyville, TN 37162
Phone: 931-684-8180 Employees: 1200
Contact: Mr Mark Harmon, Plant Manager
311615 Chicken slaughtering & processing; poultry
services

U S Fence Inc

PO Box 100
Bulls Gap, TN 37711
Phone: 423-235-4113 Employees: 1000
Contact: Mr Ken Klatt, VP Operations
326199 Manufactures plastic fencing accessories

U S Xpress Inc

4080 Jenkins Rd
Chattanooga, TN 37421
Phone: 423-510-3000 Employees: 8100
Contact: Mr Max L Fuller, President
484121 Over the road trucking

U T Medical Group Inc

920 Madison Ave
Memphis, TN 38103
Phone: 901-448-7000 Employees: 600
Contact: Vondale Rogers, Office Manager
621111 General & family practice physician or
surgeon office

Unipres USA Inc

PO Box 799
Portland, TN 37148
Phone: 615-325-7311 Employees: 600
Contact: Not Available
336370 Manufactures stamped metal automobile
body parts

United Methodist Publishing House

PO Box 801
Nashville, TN 37202
Phone: 615-749-6000 Employees: 675
Contact: Mr Neil M Alexander, President
511130 Books publishing & printing; wholesales
books, periodicals & newspapers; retails
books; publisher; periodical publisher

United Parcel Service Inc

705 Massman Dr
Nashville, TN 37210
Phone: 615-889-5700 Employees: 1500
Contact: Terry Simmons, Branch Manager
492210 Parcel delivery services by vehicle

United Parcel Service Inc

3675 Swinnea Rd
Memphis, TN 38118
Phone: 901-547-6950 Employees: 1500
Contact: Mr Mike Repischka, Manager
492110 Ground courier services; air courier services

United States Department of the Air Force

100 Kindel Dr Ste A315
Arnold AFB, TN 37389
Phone: 931-454-6602 Employees: 2000
Contact: Mr William Gonce, Branch Manager
541380 Product testing laboratory; united States Air
Force

United States Department of the Navy

7800 3rd St
Memphis, TN 38106
Phone: 901-874-5804 Employees: 2300
Contact: Not Available
621210 Dentists' office & clinic; united States Navy

University Health System Inc

1924 Alcoa Hwy
Knoxville, TN 37920
Phone: 865-544-9430 Employees: 2000
Contact: Mr Joseph Landsman, President
622110 Medical hospital

University of Tennessee

1520 Cherokee Trl Ste 200
Knoxville, TN 37920
Phone: 865-544-9430 Employees: 3500
Contact: Mr Joseph Landsman, CEO
621112 Medical center

University of Tennessee

PO Box 17
Memphis, TN 38163
Phone: 901-448-5656 Employees: 4000
Contact: Dr Timothy Mandrell, Ch of Bd
621511 Medical laboratory

UNUM Group

1 Fountain Sq
Chattanooga, TN 37402
Phone: 423-755-1011 Employees: 500
Contact: Mr Thomas R Watjen, President
524113 Accident insurance carrier service; life insurance carriers; provides group hospitalization service plans; provides pensions

US Army Corps of Engineers

PO Box 1070
Nashville, TN 37202
Phone: 615-736-5538 Employees: 800
Contact: Roem Hildt, Manager
541330 Engineering services; united States Army

US Army Corps of Engineers

157 N Main St B202
Memphis, TN 38103
Phone: 901-544-3226 Employees: 500
Contact: Mr Cole Smith, Principal
541330 Engineering services; united States Army

US Fence Inc

PO Box 100
Bulls Gap, TN 37711
Phone: 423-235-4113 Employees: 500
Contact: Mr Mark Burton, Manager
444190 Fencing dealer; manufactures treated lumbe

Ut-Battelle LLC

PO Box 2008
Oak Ridge, TN 37831
Phone: 865-576-2900 Employees: 4000
Contact: Mr Brian Kaldenbach, Manager
541712 Energy research services

Ut-Battelle LLC

1201 Oak Ridge Tpke
Oak Ridge, TN 37830
Phone: 865-220-5101 Employees: 4000
Contact: Mr Jeffrey Wadsworth, President
541712 Energy research services

Varco Pruden Buildngs Inc

PO Box 7527734
Memphis, TN 38125
Phone: 901-748-8000 Employees: 1100
Contact: Mr Chuck Haslebacher, President
332311 Manufactures prefabricated metal buildings components

Verizon Business Network Services Inc

1725 N Shelby Oaks Dr
Bartlett, TN 38134
Phone: 901-377-5937 Employees: 1100
Contact: Mr Edgar Cooney, Branch Manager
517911 Long distance telephone communications services

Veterans Health Administration

1030 Jefferson Ave
Memphis, TN 38104
Phone: 901-577-7250 Employees: 2000
Contact: Mr Patrick Coney, CFO
923140 Veterans' affairs administration services;
medical hospital

Volunteer Behavioral Health Care System

PO Box 4028
Chattanooga, TN 37405
Phone: 423-756-2740 Employees: 600
Contact: Mr Larry Thompson, COO
621420 Outpatient mental health clinic; mental
hospital

Vought Aircraft Industries Inc

1431 Vultee Blvd
Nashville, TN 37217
Phone: 615-361-2000 Employees: 650
Contact: Ricky Davis, Opers Mgr
336413 Manufactures aircraft wing assemblies &
parts

Wackenhut Corp

1321 Murfreesboro Pike # 155
Nashville, TN 37217
Phone: 615-360-6546 Employees: 500
Contact: Mr Andre Dedlack, Branch Manager
561612 Security guard service

Wackenhut Corp

2158 Union Ave Ste 500
Memphis, TN 38104
Phone: 901-278-7777 Employees: 500
Contact: Not Available
561611 Lie detection services

Walker Die Casting Inc

PO Box 1189
Lewisburg, TN 37091
Phone: 931-359-6206 Employees: 550
Contact: Mr Robert H Walker, Ch of Bd
331521 Manufactures aluminum die castings

Wal-Mart Stores Inc

2000 Old Fort Pkwy
Murfreesboro, TN 37129
Phone: 615-893-0175 Employees: 500
Contact: Mr Tim Fox, Manager
452112 Discount department store; retail
supermarkets or hypermarket, greater than
100,000 square feet

Wal-Mart Stores Inc

6777 Clinton Hwy
Knoxville, TN 37912
Phone: 865-938-6760 Employees: 500
Contact: Mr Scott Nickens, Branch Manager
452112 Discount department store; retail
supermarkets or hypermarket, greater than
100,000 square feet

Wal-Mart Stores Inc

3360 Tom Austin Hwy
Springfield, TN 37172
Phone: 615-384-9561 Employees: 500
Contact: Mr Greg Lee, Manager
811111 General automotive repair services; discoun
department store; retail supermarkets or
hypermarket, greater than 100,000 square
feet; pharmacy & drug store

Wal-Mart Stores Inc

570 Enon Springs Rd E
Smyrna, TN 37167
Phone: 615-355-1029 Employees: 500
Contact: Mr Chris Ward, Manager
452112 Discount department store; retail
supermarkets or hypermarket, greater than
100,000 square feet

Wal-Mart Stores Inc

2200 Brookmeade Dr
Columbia, TN 38401
Phone: 931-381-6892 Employees: 550
Contact: Mr Richard Bald, Manager
452112 Discount department store; retail
supermarkets or hypermarket, greater than
100,000 square feet

Wal-Mart Stores Inc

8480 US Highway 64

Memphis, TN 38133

Phone: 901-384-9997 Employees: 500

Contact: Mr John Moreschi, Manager

452111 Department store; general automotive repair services; portrait studio; pharmacy & drug store; grocery store; tire dealer

Wal-Mart Stores Inc

1112 Nashville Pike

Gallatin, TN 37066

Phone: 615-452-8452 Employees: 500

Contact: Mr Steve Williams, Manager

452112 Discount department store; retail supermarkets or hypermarket, greater than 100,000 square feet; retails auto & home supplies; portrait studio; pharmacy & drug store; beauty salon

Wal-Mart Stores Inc

475 S Davy Crockett Pkwy

Morristown, TN 37813

Phone: 423-587-0495 Employees: 500

Contact: Mr John McElroy, Manager

452112 Discount department store

Wal-Mart Stores Inc

1030 Hunters Xing

Alcoa, TN 37701

Phone: 865-984-0154 Employees: 500

Contact: Boy Smith, Manager

452112 Discount department store; retail supermarkets or hypermarket, greater than 100,000 square feet

Wal-Mart Stores Inc

1001 Over Mountain Dr

Elizabethton, TN 37643

Phone: 423-543-8133 Employees: 500

Contact: Mr Donnie Wills, Manager

452112 Discount department store; pharmacy & drug store

Wal-Mart Stores Inc

2196 Emporium Dr

Jackson, TN 38305

Phone: 731-664-1157 Employees: 500

Contact: Mr Jeff Shultz, Manager

452112 Discount department store; retail supermarkets or hypermarket, greater than 100,000 square feet

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PO Box 238

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Phone: 423-224-4000 Employees: 1800

Contact: Mr Bert Whitaker, Principal

622110 Medical hospital; skilled nursing care facility

Westgate Resorts Marketing

915 Westgate Resorts Rd

Gatlinburg, TN 37738

Phone: 865-430-4036 Employees: 500

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721110 Resort hotel

Williamson County Hospital District Inc

4321 Carothers Pkwy

Franklin, TN 37067

Phone: 615-435-5000 Employees: 1100

Contact: Mr Dennis Miller, President

622110 Hospital, affiliated with AMA residency

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Contact: Mr Gary Staggs, Plant Manager

339920 Manufactures baseball equipment & supplies, general

Wolf Tree Experts Inc

PO Box 5416

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Phone: 865-687-3400 Employees: 602

Contact: Mr Tom Wolf, President

237110 Utility line construction

Wright Medical Technology Inc

PO Box 100

Arlington, TN 38002

Phone: 901-867-9971 Employees: 500

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339113 Manufactures surgical appliances & supplies;
retails orthopedic & prosthesis applications;
manufactures electromedical equipment;
mental health physicians' office & clinic

Yates Services LLC

PO Box 877

Smyrna, TN 37167

Phone: 615-459-1701 Employees: 1900

Contact: Mr Larry Guffey, Member

561720 Building cleaning & maintenance services

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Nashville, TN 37209

Phone: 615-350-8814 Employees: 750

Contact: Mr William Anderson, Manager

484121 Contract haulers

Yorozu Automotive Tennessee Inc

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Phone: 931-668-7700 Employees: 1000

Contact: Yusuke Kawada, President

336370 Manufactures stamped metal automobile
moldings or trim

Appendix B – Nashville MPO Regional Transportation Plan



NASHVILLE AREA

Metropolitan Planning Organization

2035 Regional Transportation Plan
Guiding Principles, Regional Goals, and Major Objectives
Endorsed by the MPO Executive Board, March 17, 2010

Guiding Principles

Guiding principles direct how the Nashville Area MPO -- working as part of a larger regional context comprised of the interests of local governments, non-profit organizations, the business community, and public citizens -- will contribute to overall quality of life for the region.

Guiding Principle #1: *Livability*

MPO plans and programs will work to enhance the quality of life in the region by supporting initiatives that increase opportunities for affordable housing, education, jobs, recreation, and civic involvement without increasing the burden on citizens to enjoy their community.

Guiding Principle #2: *Sustainability*

MPO plans and programs will strive to support growth and prosperity without sacrificing the health, environment, natural and socio-cultural resources, or financial stability of this or future generations.

Guiding Principle #3: *Prosperity*

MPO plans and programs will contribute to the continued economic well-being of the greater Nashville area by investing in transportation solutions that increase access to education, jobs, and amenities, reduce the cost of living and doing business, and attract new investment to the region.

Guiding Principle #4: *Diversity*

MPO plans and programs will recognize the multitude of needs and the variety of perspectives and backgrounds of the people that live and work in the greater Nashville area by promoting a range of transportation choices that are designed with sensitivity to the desired context.

Regional Goals

The regional goals embody a general set of strategies by which the Nashville Area MPO will seek to help the region in its pursuit of quality growth as directed by the overarching guiding principles.

- Goal # 1:** Maintain and Preserve the Efficiency, Safety, and Security of the Region's Existing Transportation Infrastructure.
- Goal # 2:** Manage Congestion to Keep People and Goods Moving.
- Goal # 3:** Encourage Quality Growth and Sustainable Land Development Practices.
- Goal # 4:** Protect the Region's Health & Environment.
- Goal # 5:** Support the Economic Competitiveness of the Greater Nashville Area.
- Goal # 6:** Offer Meaningful Transportation Choices for a Diverse Population including the Aging.
- Goal # 7:** Encourage Regional Coordination, Cooperation, & Decision-Making.
- Goal # 8:** Practice Thoughtful, Transparent Financial Stewardship by Ensuring that Transportation Improvements meet Regional Goals.

Major Objectives

The major objectives represent specific strategies and actions that the MPO wishes to implement en route to achieving the regional goals of the 2035 Regional Transportation Plan.

- Objective #1:** Adopt a “fix-it-first” mentality in directing transportation funding. Initial focus should always be on the maintenance or improvement of existing facilities.
- Objective #2:** Strive for quality over quantity. Build out all elements of priority projects or phases rather than stringing funding out over several incomplete projects or incomplete phases.
- Objective #3:** Shift investment strategies towards providing a diversification of modes, rather than solely on strategies focused on roadway capacity.
- Objective #4:** Improve marketing and promotion of successful existing transportation services. It is acceptable to use federal transportation funds to do this.
- Objective #5:** Provide opportunities and define roles for all types of organizations and/or individuals (public or private) to assist in the implementation of programs and projects.
- Objective #6:** Improve the coordination of land use, urban design, transportation, rural and environmental feature preservation, and economic development policies and decisions through incentives and/or policies.
- Objective #7:** Encourage the development of context sensitive solutions to ensure that community values are not sacrificed for a mobility improvement.
- Objective #8:** Increase efforts to improve the form and function of transportation corridors in order to contribute to the “sense of place.” Such investments can: improve attractiveness to visitors or prospective businesses or residents; compliment existing natural and cultural resources; improve the function of the road for a variety of users; and foster civic pride toward public investments in infrastructure.
- Objective #9:** Consider how transportation policies, programs, and investment strategies affect the overall health of people and the environment including air quality, physical activity, biodiversity, and the natural resources.
- Objective #10:** Invest in the development of walkable communities that offer citizens the ability to access residences, jobs, retail, recreation, and other community amenities without the need to rely on an automobile.
- Objective #11:** Invest in a modern regional mass transit system to maintain the region’s economic competitiveness with other metropolitan regions, and to ensure continued economic prosperity in the face of growing energy costs, environmental concerns, and increasingly expensive automobile traffic.
- Objective #12:** Work to ensure that Middle Tennessee is given priority consideration in proposed national plans for high-speed rail. Identify opportunities to coordinate regional mass transit planning efforts with super-regional and national efforts to invest in rail infrastructure.
- Objective #13:** Provide proper guidance to the region for how to bridge the gap between the MPO's "cost-feasible" plan and the ultimate vision for how transportation will shape the future of the region.

Appendix C – TVA Smart Station

Tennessee Valley Authority Smart Modal Area Recharge Terminal (SMART) Station Project

Volume 1 – Base Design Report

Tennessee Valley Authority Smart Modal Area Recharge Terminal (SMART) Station Project

Volume 1 – Base Design Report

1020782

Final Report, June 2010

EPRI Project Manager
J. Halliwell

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PRODUCT DESCRIPTION

This report documents the base design for a Smart Modal Area Recharge Terminal (SMART) station. The base design is for a 10-space public vehicle charging facility, incorporating a solar photo-voltaic array/canopy with battery storage. Many of the design recommendations are based on the system design experience of Eaton Corporation in related energy applications and cover safety compliance and field integration. The design effort was conducted not only to develop a base design that can be used by other entities working to provide similar infrastructure, but also to investigate the opportunities and issues such a system presents. The design also allowed such elements as the feasibility and cost of modularity to be explored for a fully engineered system.

Volume 1 of this document discusses the base design effort. Volume 2 is planned to follow construction of the first system to document the build experience.

Results and Findings

A design incorporating several key project goals has been developed. This design can be used as a basis for a publically deployed charging infrastructure and as a way to gauge the potential costs of such infrastructure. It is possible to build complex charging infrastructure as described in this design report, but it is likely that budgetary constraints will be a key driver in the sizing of system elements.

Challenges and Objectives

Understanding and developing public charging infrastructure that incorporates multiple technologies has many challenges. Since consumer habits for the use of plug-in electric vehicles are not well understood, some assumptions as to potential use and location of such infrastructure must be made. Sizing of the various system elements must be made on general use assumptions for the system. The cost implications of these decisions can then be accessed. The objective of undertaking this design was to identify the opportunities and challenges that would need to be addressed to deploy more complex vehicle-charging hardware in the public space.

Applications, Value, and Use

The results from development of the base design are being used as the basis for continuing efforts to deploy a number of public charging stations throughout the Tennessee Valley and beyond. Understanding how the public will interact with this new infrastructure will allow future deployment of charging hardware in a way that best meets the needs of the driving public while doing so in the most cost-effective way.

EPRI Perspective

EPRI brings the unique perspective of a full knowledge of the electric system and the utility industry. If the electric grid is to become the “filling station pipeline” of the future, then utilities

must be at the forefront of infrastructure development and deployment. Understanding the grid impact of such systems, managing this load growth, and planning resources to meet future needs are essential to maintaining reliable and reasonably priced electric service. Providing reliable and reasonably priced electric service is basic to the electrification of transportation.

Approach

Based on a series of stakeholder meetings, a basic set of design requirements was developed and implemented in a base solar-assisted charging station design.

Keywords

Battery storage

Charging

Energy management

Electric vehicle

Electric vehicle supply equipment (EVSE)

Solar assist

ABSTRACT

This document details the design of a system providing plug-in vehicle charging infrastructure that includes a solar array, battery storage, and smart metering infrastructure. The system is referred to as the TVA Smart Modal Area Recharge Terminal or “SMART Station.” The design effort has investigated system modularity, key components, required materials, and cost issues related to the construction of such a system. Many of the design recommendations are based on the system design experience of Eaton Corporation in related energy applications and cover safety compliance and field integration. The goal of this effort has been to investigate and produce a public design document that will allow other organizations considering the construction of similar infrastructure to have a base to work from. While no one design can be used universally for public infrastructure, it is hoped that this design can act as a starting point and knowledge base for the development of public infrastructure across the United States.

Volume 1 of this document discusses the base design effort. Volume 2 is planned to follow construction of the first system to document the build experience.

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- Tennessee Valley Authority (TVA)
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- Oak Ridge National Laboratory (ORNL)
Curt Maxey, Melissa Lapsa, and Randy Overbey

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1

INTRODUCTION

Troubled by the high cost of oil and concerned over both environmental impact of gasoline-powered vehicles and energy security for transportation, U.S. citizens and the current Administration are demanding the implementation of innovative vehicle and energy solutions. Electric vehicles (EVs) may serve as an important bridge from a transportation system based on hydrocarbons to one that uses electric energy. EVs offer benefits to the public through reduced carbon emissions and a more efficient and full use of the electric system, while providing the reliable and cost-effective transportation services they expect. Moreover, the EV may serve as the key to the revitalization of the U.S. automotive manufacturing sector, which would benefit the public through U.S. job creation and increased economic stability.

Nearly every major automotive manufacturer has announced plans to produce either a plug-in hybrid or all-electric vehicle, with 2010 anticipated to be the introduction year for many. Incentives to encourage the production and adoption of electric transportation are being offered by the federal government through low interest loans for manufacturers and consumer tax credits. The Department of Energy (DOE), through the American Recovery and Reinvestment Act of 2009 (ARRA), originates and manages the federal investment in new technologies and infrastructure. However, the success of the electric vehicle is largely dependent upon the quality and availability of a supporting infrastructure that presently does not exist and may potentially provide technical challenges. The Electric Power Research Institute (EPRI) is working with the electric and automotive industries to meet these challenges.

EPRI, working with the Tennessee Valley Authority (TVA), has contracted with Eaton Corporation to provide a baseline system design for a Smart Modal Area Recharge Terminal (SMART) Charging Station. Throughout the process of project formation and the design effort, the Oak Ridge National Laboratory (ORNL) was engaged to provide consulting advice to the project. This baseline design will be used as a benchmark for deployment of SMART Charging Stations (hereafter called “SMART Stations”), in a first phase focusing on the TVA service territory and then, potentially, nationwide.

Once constructed, these sites will enable research and provide critical data for the analysis of consumer behavior patterns relevant to EV charging and its impact on the electrical system. Also the physical and commercial arrangements required to build a system of EV charging stations will be known. These data can be used to help optimize future installations. The project will provide a basis for the design of larger or smaller systems, as well as more advanced systems that may be deployed nationally. It is expected that the increased availability of charging sites will encourage widespread consumer adoption of the EV.

Goals Pursued in This Initiative

As part of a larger EPRI/TVA initiative, this base design attempts to address a variety of broader project goals that need to be met in the realm of research and awareness, both in the social and technical arenas. This design is one aspect of a project that seeks to create a public and open laboratory environment showing the benefits of the electric vehicle, solar, and battery technologies.

Four key goals being addressed in the base design are as follows:

- Increase EV and renewable awareness

Awareness and knowledge varies widely among government officials and the general public about electric vehicles and renewable technologies. The SMART Station should enable an awareness of transportation electrification opportunities and supporting technologies. This will be done through direct means, such as placards and visual displays, and indirect means, such as positioning of the technology itself within a space, creating an educational experience. The architectural design of the SMART Station will have a progressive and premium feel in keeping with presenting a positive experience to the station user.

- Apply grid-tied solar to assist vehicle charging

The application of a grid-tied solar photovoltaic array in the SMART Station will allow the system to offset a portion of the energy consumed by vehicle charging.

- Apply dispatchable, grid-tied battery storage to assist vehicle charging

The stationary battery storage present in the SMART Station design enables testing and evaluation of different battery energy dispatch methodologies including compensating for output variation of the solar array in variably cloudy conditions, dispatch during peak time, compensation for peak system loads during daytime charging, and ancillary service support.

- Explore the use of demand-response-enabled EV loads

Plug-in electric vehicles are among the newest and most significant loads anticipated in the next several years for the electric grid. Much like the air conditioning boom of the 1950s and 1960s, utilities will have to adapt the electric grid to support electric vehicles. It is desirable to develop demand response (DR) strategies for vehicle charging that utilities can apply to mitigate peak energy demands on the grid. This is especially true of daytime vehicle charging, which is expected to be the primary use of SMART Station infrastructure as described in this report. In its simplest form, DR can be implemented as on/off control of vehicle charging. Enhanced communications capabilities that are expected to become part of both electric vehicle supply equipment and the plug-in vehicle will enable more sophisticated control to be developed in the future such as dynamically controlling the vehicle charge power on a real-time basis. The SMART Station design will incorporate features to enable the exploration of these DR possibilities.

Objectives of the SMART Station Design

The base design was structured to address the following criteria:

- Enable all functionality to achieve the previously stated overarching project goals.
- Be both modular and expandable (allowing this design to be extended to fit other size installations in the service areas of other utilities)
- Provide an iconic image for a solar-assisted EV charging site.
- Provide a replicable design.
- Mitigate load clustering from the simultaneous charging of multiple vehicles.
- Ensure distribution circuit support flexibility.

A primary component for achieving the project goals is data collection, which enables studies in several areas of interest.

- Develop EV, solar, and battery storage usage models.

Data collection enables usage models to be built that will help with understanding how each of these technologies individually and in combination can impact a local utility.

- Track consumer charging habits.

Monitoring of space occupancy and energy usage will enable tracking of consumer charging habits at the charging station. A better understanding of system use profiles will allow right-sizing of the various system elements and will help to build an understanding of the economics of this type of public infrastructure.

- Influence the National Electric Code (NEC) diversification strategy for EV stations.

Utilities and electrical inspectors are realizing that a diversification strategy needs to exist for sizing electric vehicle supply equipment (EVSE) in a building's electrical distribution network. The SMART Station will enable data collection to allow scientific determination of the diversification factor for the public charging infrastructure.

Diversification is the factor applied to a load when sizing upstream protection and utility service. Currently, EVSE is required in accordance with the National Fire Protection Association (NFPA-70) in the National Electric Code (NEC) Article 625.14 to “be considered a continuous load.” This means the 10-station SMART Station design with an EVSE listed for 32A output would have to be served by a utility service of a least 400A, allowing for the 125% protection of each circuit (NEC 625.21). The design described in this document is based on the continuous load duty factor.

- Study distributed ancillary services.

Frequency regulation and synchronized reserves dispersed at the branches of the grid's distribution network have interested many utilities, especially when done in a distributed

manner. The data collection will allow distributed ancillary services to be studied more closely.

Each of these aspects was considered as part of the overall design effort. Chapter 2 covers the design concepts. Chapter 3 provides a discussion of vehicle energy needs and how they impact the SMART Station design. Chapter 4 discusses details of the design and a summary of lessons learned during the design process. Chapter 5 discusses structural and other considerations that influence system design choices. Chapter 6 discusses system cost metrics.

2

DESIGN CONCEPT

The design described in this report is the product of a series of discussions held among interested stakeholders within the state of Tennessee over several months in 2008 and 2009. Although the basic system concepts were developed, it was recognized that there was a need to fully develop these outline ideas and solidify a system design in order to allow a better assessment of the cost of the infrastructure and enable wider sharing of the lessons learned during the effort.

In the fall of 2009, Eaton Corporation was engaged to take input from the stakeholder team and develop a full system design. The design was driven by the requirements outlined in Section 1 of this document. The results of this design effort, a full set of system construction drawings and documentation, are contained in Appendix B of this report. These drawings provide and document a nearly build-ready system design. While this design incorporates many aspects of national and international codes and standards for electrical and construction practices, building and construction codes are still implemented and enforced at the local level. This means that several factors might prevent the immediate use of the design such as local building code variations, soil conditions for the canopy footers, local zoning requirements, and the seismic category for a chosen station site.

Figure 2-1 shows a conceptual drawing of the system as designed. The site is designed to provide for two “nose-to-nose” parking isles. An education and dynamic system display element is shown in the figure and is presented in more detail in Figure 2-2.

This section provides details for the as designed SMART Station. Sections following address some of the lessons learned and provide more detail on other system issues that have been considered throughout this effort.



Figure 2-1
Conceptual Drawings of the SMART Station

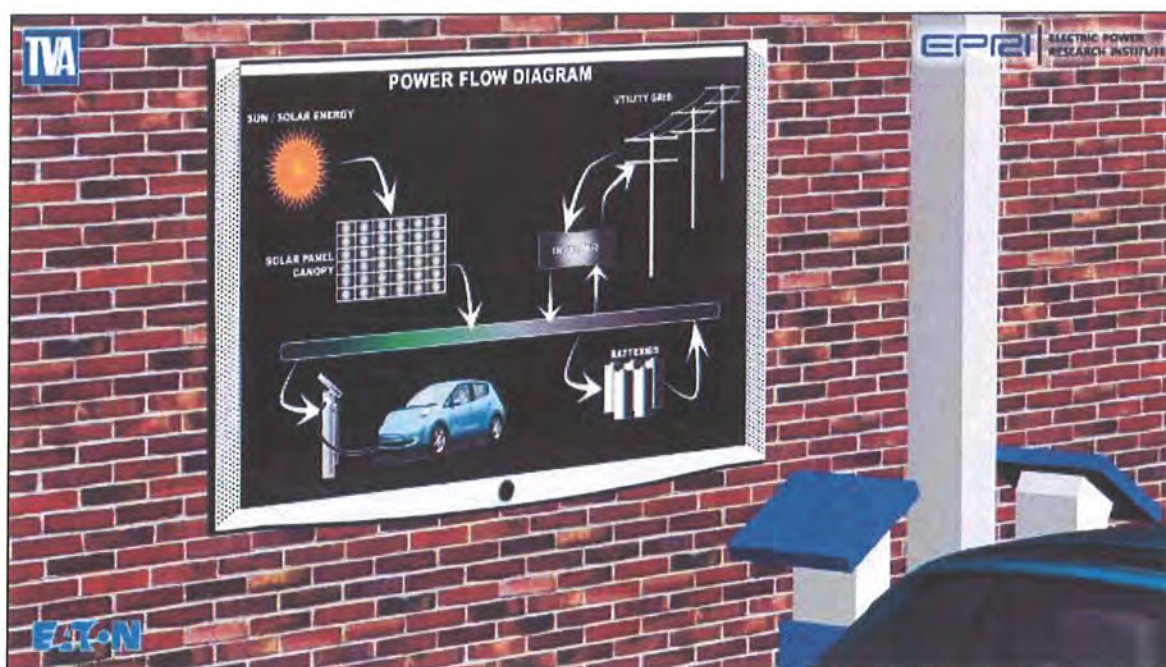


Figure 2-2
Detail Conceptual Drawing of the Educational Dynamic Display

The base design described in this document has the following attributes:

- Ten parking spaces each with electric vehicle supply equipment (EVSE) rated at 32 A, 240 V (7.68 kW capacity)
- Approximately 2 kW of solar photovoltaic (PV) panels provided per charge space (Its primary function is to offset vehicle energy usage.)
- Nose-to-nose parking layout with a center access aisle
- Approximately 5 kWh of usable battery storage provided per charge space (Its primary functions is to allow mitigation of peak system power demand.)
- All subsystems are linked by being grid-tied.
- A covered parking canopy (approximately 33' x 55' [10 x 17 m]) with a minimum of 13.5' (4 m) of vehicle clearance
- A “drip-free” canopy design
- Subsystems modular at the two-space level
- Complete design from the service transformer through the charge station
- Provides for the inclusion of advanced metering infrastructure (AMI)
- Includes comprehensive data collection capabilities for energy flows within the system.
- Designed to provide a public showcase for SMART charging technologies and as a laboratory for SMART charging infrastructure.

- Spaces are sized to provide accessibility for disabled drivers.

The design was produced assuming that an existing level parking area with sufficient space for the full system would be used.

As stated above, the design is based on grid-tied system elements. It was considered early in the design process that to maintain maximum flexibility in both sizing and actual hardware used for the various subsystems, the grid would be used as the energy interface. Integration of direct energy flows, such as from the battery direct to the vehicles is not considered. There is a great deal of freedom provided by using grid-tied hardware. This allows for full modularity of each system element: vehicle charging, battery storage, and a solar photovoltaic array. One could view the system as incorporating these three elements with each scaled from 0% to 100%.

With two-space modularity, the battery storage and solar arrays can be scaled from 0% to 100% in 20% increments. With individual EVSE hardware for each parking space, charging can be scaled in 10% increments. Additionally, having grid-tied systems decouples the internal design of each system, such as the dc bus voltage of the battery or solar array, from the overall system interconnects. Figure 2-3 illustrates the grid-tied concept.

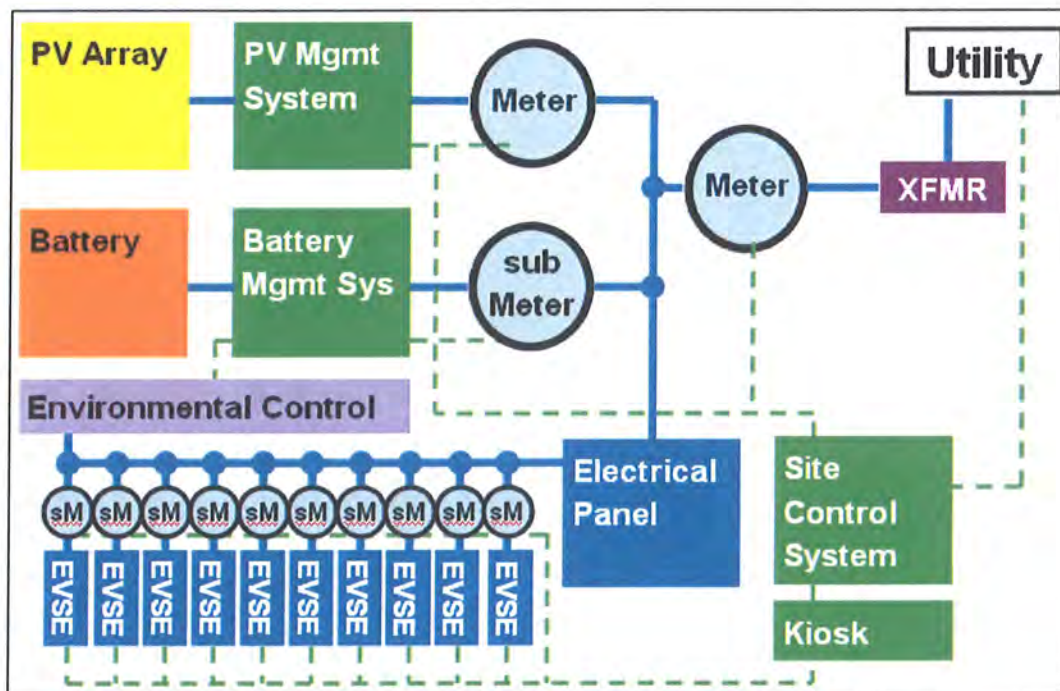


Figure 2-3
Simple Block Diagram of the System

The net power flows in the system can be tracked by measuring the energy input/output for each system element.

The primary system elements as shown in Figure 2-4 are:

- One each – Electrical equipment: main switch board: 120V/240 V single phase, 3 wire , 42 kA interrupt current , service entrance rated with 800 amp main breaker
- Ten each – Vehicle charging: Level 2 EVSE units: 32 amp @ 240 volts ac (7680 W)
- Five each – Solar array: 4.1 kW solar array; Sets of 10 each REC AE-US, multicrystalline solar panels
- Five each – Battery storage: pairs of stacked 3600 KVA grid interactive inverter/charger systems; 696 AH, 48 V battery storage systems
- One each – HVAC/lighting: climate control for battery space and system lighting

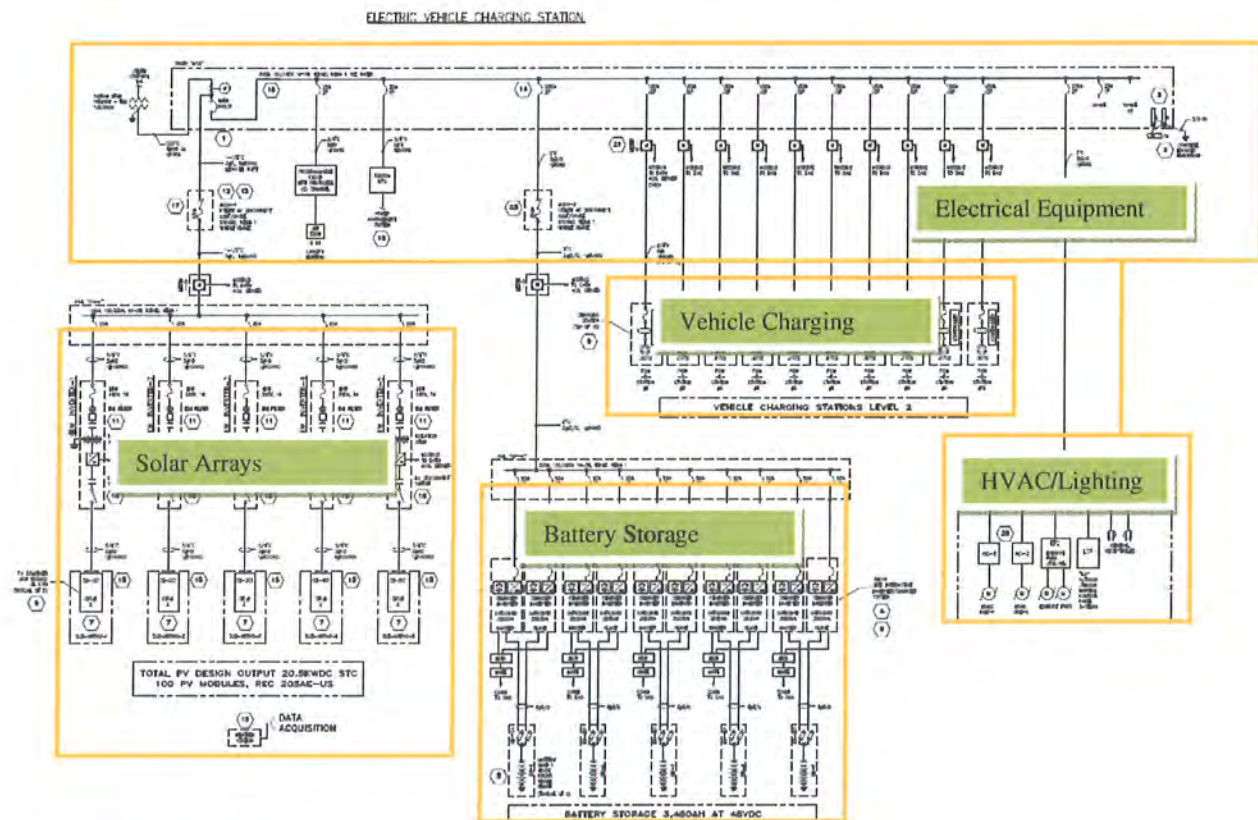


Figure 2-4
Detailed System One-Line Diagram (see Appendix B for a full size version)

A modular design results in a slight cost penalty when compared to an optimized design with single large-capacity devices. This is due to the fact that multiple smaller inverters for the solar array and inverter/chargers for the battery system come at a slight cost premium. A cost-optimized design would likely incorporate a single solar array inverter and a single inverter/charger for the battery, both sized for the full system capacity. EPRI is currently exploring the use of micro-inverters for solar arrays. This represents carrying the modularity to

the lowest level, where each solar panel incorporates an inverter. The use of multiple smaller system segments allows for this design to be scaled to site needs.

A long-term project goal is related to the exploration of other battery technologies for stationary storage. Specifically, the secondary use of vehicle traction batteries for stationary storage is of interest. It was initially considered that lithium-ion batteries might be used in this base design, but this was set aside for this base design due to the lack of commercial availability of both batteries and charging infrastructure using lithium-ion technology. It is hoped that later in the program, as future SMART Stations are constructed, the incorporation of lithium-ion battery technology will be possible. This, again, is an option readily supported by the grid-tied nature of the battery system. By modifying the overall system controls, it is also possible that a future retrofit of lithium-ion batteries could be done in the field at a SMART Station site. This is supported by the fact that a Lithium-ion battery system would be much smaller and lighter than the existing lead-acid system.

Batteries carry with them a unique aspect not required by other system hardware—namely, climate control. Although batteries can operate over a wide temperature range, this range is more limited than would be expected to be encountered in an outdoor setting. In order to ensure available capacity, longevity, and reliability, the batteries must be housed in a climate-controlled environment. In addition, lead-acid batteries also require proper ventilation and provision for spill control within the battery space. Balancing provision of climate-controlled space with an iconic station look led the Eaton designers to recommend the use of a prefabricated electrical building. This structure is similar to the type of building commonly seen at cell phone tower sites. These structures are factory built with all custom electrical hardware installed prior to field delivery. In addition, they offer the added benefit of flexible exterior finish options to allow matching the structure to existing architectural features at a given site. This matching is critical to maintaining an iconic look and an excellent overall esthetic for the system. Sizing the floor space of the climate-controlled area for the lead-acid system ensures that adequate space will be available if a site wants to use lithium-ion batteries.

3

VEHICLE ENERGY NEEDS

Sizing of the various system elements is primarily tied to the energy needs of the vehicles using the SMART Station. This section covers the procedure that was used to estimate vehicle energy needs. These numbers represent a best guess at what type of usage a charging site might see. As has been previously stated, actually measuring the energy use profile for the SMART Station represents a key goal for this program.

Vehicle Battery Capacity

A typical value of energy usage per mile (1.6 km) for all-electric operation of a vehicle is about 240 Wh. For a vehicle to have a 100-mile (161-km) range, the onboard battery capacity to support all electric operation would need to be about 24 kWh. For a 200-mile (322-km) range vehicle, this increases to 48 kWh. This represents the upper bound of likely battery sizes for electric vehicles in the near term.

For plug-in hybrid electric vehicles (PHEVs), how manufacturers will size batteries is less clear and is driven by a number of factors including cost and the all-electric range of the vehicle. For a PHEV that can travel 40 miles (64 km), again assuming 240 Wh per mile (1.6 km), the battery would need to have a capacity of nearly 10 kWh. For a 20-mile (32-km) PHEV, the capacity requirement is halved to about 5 kWh. Note that while this does give a sense of vehicle battery sizing, it does not address how much energy a vehicle might use while at public charging infrastructure.

Actual energy use is a function of both battery capacity and, more important, the battery state of charge, that is, how far a vehicle has been driven before charging. Other factors such as driver aggressiveness, terrain, and climate will influence energy requirements but were not considered in these calculations.

Vehicle Charging Needs

Despite the fact that a number of electric vehicle programs have been announced by automotive manufacturers, widespread production of plug-in vehicles has not occurred to date. Specifications for such vehicles are often preliminary and subject to change. In order to estimate the charging needs at a public charging station, some basic assumptions can be made to yield ballpark power requirements for the system. Note that what we are seeking here is a reasonable upper bound on energy usage per vehicle and, thus, the energy requirements for the SMART Station as a whole.

Several assumptions must be made to calculate vehicle energy needs. Not included here are elements such as energy use related to preheating or precooling a vehicle while connected to the grid. The first assumption is the number of miles a vehicle is driven per year. Here we will use 12,000 miles (19,300 km) per year. A second parameter is the energy used by the vehicle per mile (1.6 km). Because we are interested only in the electrical energy usage needs of the vehicle, we will assume that for all electric vehicle operation it takes about 0.24 kWh of energy to travel 1 mile (1.6 km). Note that the actual number would vary by vehicle design (weight, aerodynamics) and driver habits. For a PHEV, if it is assumed that the vehicle operates in electric-only mode, often referred to as “charge-depleting” mode, for the full trip distance, then PHEV energy usage would be the same as it would be for an all-electric vehicle. Now we can calculate some key parameters:

Miles traveled per year = 12,000 miles (19,300 km)

Energy used per mile = 0.24 kWh/mile (0.24 kWh/1.6 km)

Energy used per year = 2,880 kWh

Miles traveled per day = 32.8 miles (52.8 km)

Energy used per day = 7.9 kWh

Miles per energy used = 4.17 mile/kWh (6.7 km/kWh)

If it is assumed that half a day’s driving is used to reach a destination where the public charging will occur, then:

Miles traveled to charge station = 16.4 miles (26.4 km)

Energy used per day = 3.9 kWh

Energy needed to charge (based on 80% charger efficiency) = 4.88 kWh

This total energy value will be used as one basis for calculating the SMART Station energy needs.

If it was assumed that a vehicle charger could operate at its maximum input power for the complete charge cycle, then the maximum energy available is shown in Figure 3-1. Note that the energy that arrives at the battery itself would be derated by the efficiency of the charger (likely in the 80%–90% range).

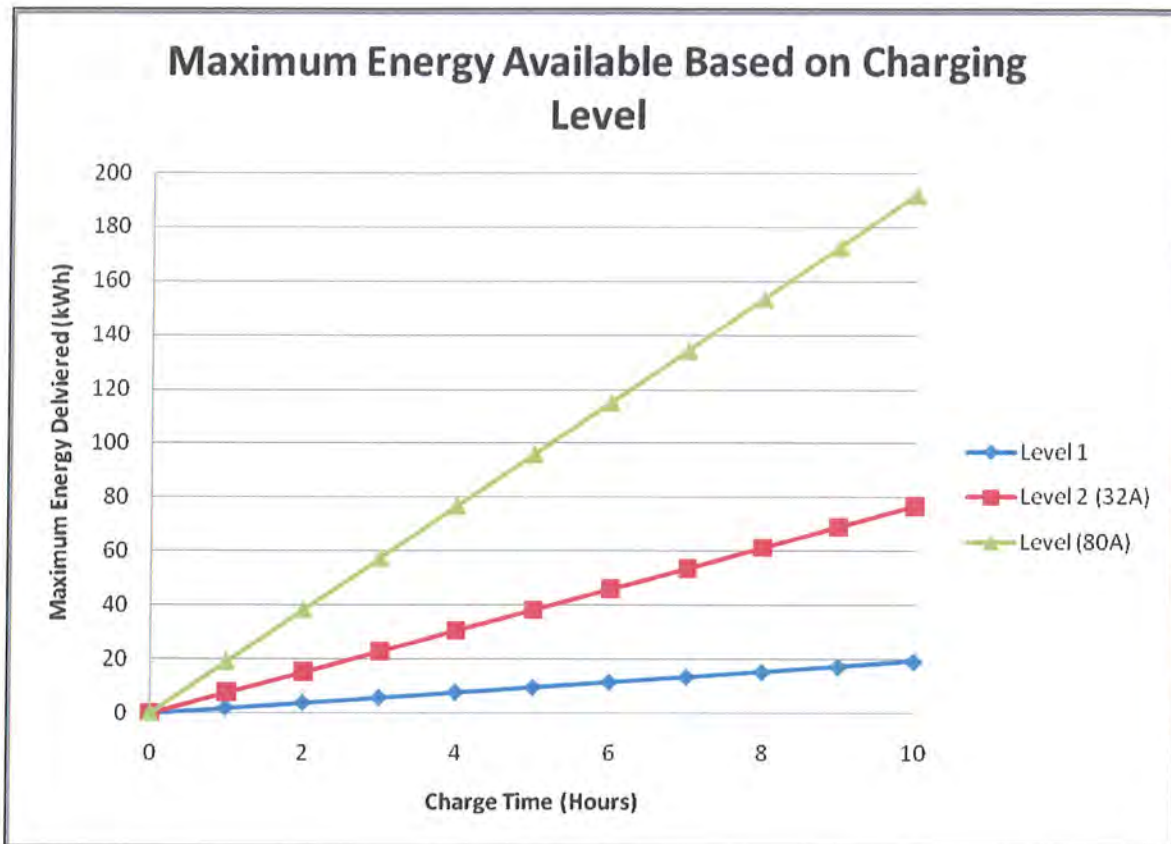


Figure 3-1
Maximum Energy Available Based on Charging Level (Level 1 is 120 Vac; Level 2 is 240 Vac)

Note that in Figure 3-1, Level 1 represents a maximum power of 1.92 kW; Level 2 with a 32 A current limit represents a maximum power of 7.68 kW; and Level 2 (80 A) represents a maximum power of 19.2 kW.

At the end of eight hours, the maximum energy that can be delivered is:

- 15.36 kWh for Level 1 20 A charging
- 61.44 kWh for Level 2 32 A charging
- 153.6 kWh for Level 2 80 A charging

Because of battery technology driven charging requirements, the actual charger power usage profile is likely to be more like that shown in Figure 3-2, where a tapering amount of energy is delivered to the battery near the end of charge.

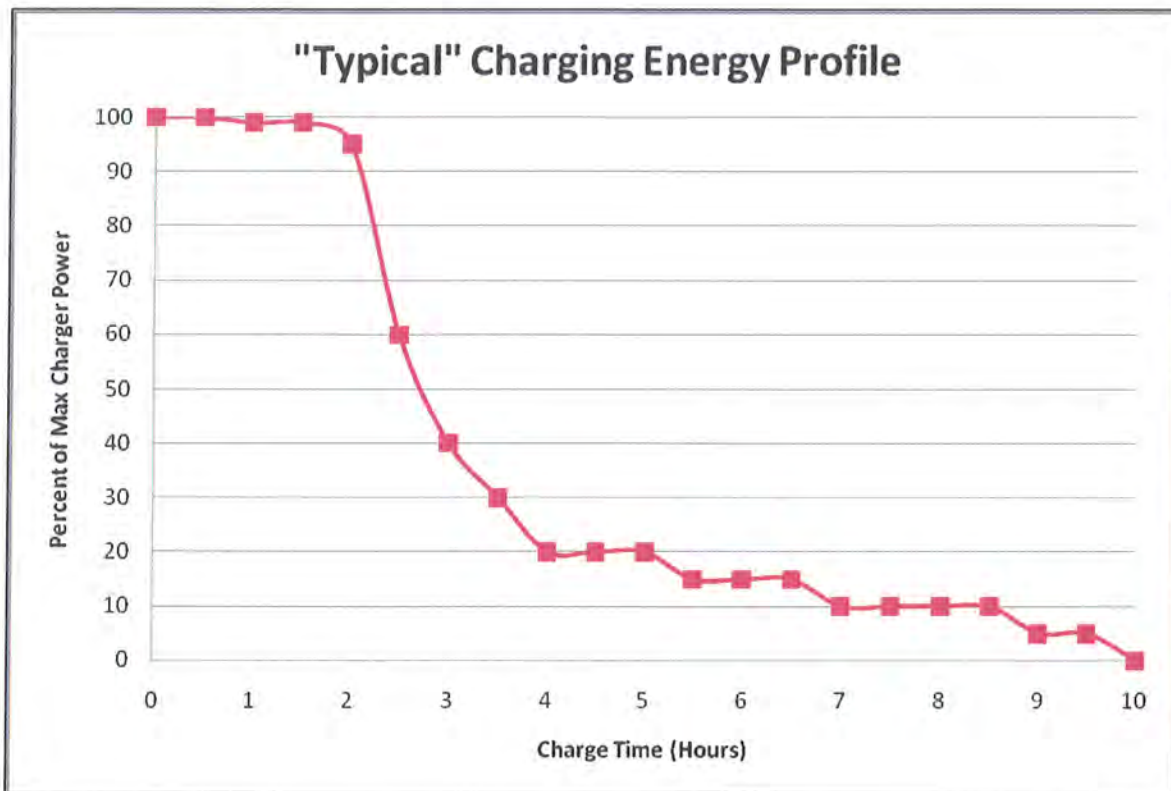


Figure 3-2
A "Typical" Charging Energy Profile

Due to the lower power levels over time as shown in Figure 3-2, the actual charge time required to reach a given energy level will be longer than would be predicted by Figure 3-1 if the vehicle dwells in a space on charge longer than the initial maximum power time period. The actual charging energy profile seen across different vehicles will vary based on the vehicle charger design and battery chemistry.

It is anticipated that vehicle chargers will present a high (0.9 to 1.0) power factor to the grid. This is due to the fact that chargers are likely to be switch-mode-based solid-state inverters with power factor correction capability inherent in the design. Another characteristic of these chargers is that they provide a broad input voltage range over which they can operate (the capability to operate from 100 to 260 Vac would be typical).

The Vehicle Impact on SMART Station Energy Needs

The SMART Station energy needs for support of vehicle charging will be strongly influenced by several factors that include:

- Vehicle battery state-of-charge (SOC) at arrival
- Time the vehicle remains on charge

- How many vehicles use a space per day
- Capacity of the vehicle charger
- Idle time for spaces

The assumptions used here focus on the upper bound of the system capability and may not reflect the power capacities offered by vehicle manufacturers. Two scenarios are considered as a starting point for total site energy needs:

- Short dwell times and high turnover (as might be seen at a retail destination charging site)
- Long dwell times with no turnover (as might be seen at a work destination charging site).

The first scenario assumes that turnover at the SMART Station is very high. Vehicles using the station arrive with a low-enough battery SOC that they charge at maximum power (as in the first 1.5 hours of Figure 3-2) during their entire dwell time in a space. Thus, the charging is power limited by either the vehicle maximum charging capacity or the capacity of the EVSE. Here we will assume that the EVSE capacity is the limit. In early discussions it was decided, based on TVA input, to limit the EVSE to a maximum 32 A charge current. This limits power to:

$$32 \text{ A} \times 240 \text{ Vac} = 7.8 \text{ kW}$$

If it is assumed that the SMART Station spaces are continuously occupied for about 4 hours a day, this gives the total energy usage as an upper bound:

$$7.8 \text{ kW} \times 4 \text{ hours} = 31.2 \text{ kWh per space per day}$$

Or 312 kWh for the whole site per day. This gives an annual energy usage of:

$$312 \text{ kWh/day} \times 365 \text{ days} = 113,880 \text{ kWh per year (upper bound)}$$

For the second scenario, it is assumed that a vehicle occupies a site for 8 hours as might be typical for a charging station located near a job site, has a high SOC, and low need of power, and that all the spaces at a site are filled every day. For a 10-space site, we can now calculate the lower bounds of the energy requirements:

$$\text{Total power per space per day} = 3.9 \text{ kWh}$$

$$\text{Total power per space per year} = 1,440 \text{ kWh}$$

$$\text{Total site power per day} = 39 \text{ kWh}$$

$$\text{Total site power per year} = 14,400 \text{ kWh (lower bound)}$$

As can be seen from these calculations, the actual energy profile for the SMART Station will vary greatly based on usage, or “load factor.” It also points out that having vehicles loiter in spaces for long periods will greatly reduce the utilization of the system capacity. These values

Vehicle Energy Needs

were used as metrics in the sizing of solar PV array and battery energy storage assets of the SMART Station.

4

DESIGN SELECTION AND LESSONS LEARNED

The initial design concepts for the solar-assisted charging station were developed in a series of meetings conducted over several months in 2009. These meetings included the participation of a number of Tennessee-based stakeholders. This effort yielded some basic design ideas that have been carried into this public design. Some of the key goals that were developed prior to starting the design included:

- Effectively integrate vehicles and the grid.
- Use solar power to offset vehicle energy use.
- Use battery storage to allow for mitigation of system peak load and to provide a platform for vertical integration of traction batteries in secondary use scenarios.
- Design an iconic look to boost public awareness of transportation electrification.
- Develop an on-premise public display system and possibly a website link that would allow the utility to see and share power and energy flows within the system. This enables the system to be used as an educational tool, promoting the electrification of transportation.

While there are a number of ways to connect the various system elements, for design flexibility it was decided that all system elements would be grid tied. This allowed for simplicity of interconnection and control and left the flexibility to change the basic structure of any system element without affecting the others. For example, if the battery were directly connected to the vehicle charging station and dc voltages used, this would lock the design to a specific battery chemistry and voltage range. By having a grid-tied battery system, the dc bus voltage of the battery is not of concern. All that need be considered for a grid-tied battery is that it provides the desired stored energy and peak power capability needed by the system. Another advantage of the use of grid-tied system elements is that all interconnects can be based on standard electrical hardware that is safety agency rated.

As with any project, there are always issues that require compromise to control total system price. The use of an equipment building to enhance the overall look of the site and to give a secure, vandal-proof housing for equipment proved to be very costly. Options, such as locating equipment in simple enclosures can be used to lower cost, but make maintaining an iconic look difficult. Since the battery requires a climate-controlled space, finding a location with existing conditioned space is also a potential option. One thing to be kept in mind related specifically to lead-acid batteries is the need for spill containment measures and proper ventilation. All battery types require consideration of fire suppression systems or measures.

While not included in the base design, a kiosk may be a useful addition to the system. A kiosk can be used to control charging access, assess fees for parking and/or charging, and provide

information to station users. Access control to charging was considered but not addressed in the base design.

Some comments are provided in the following section related to the primary system elements and the design process.

System Elements

Electric Vehicle Supply Equipment (EVSE)

Level 2 charging was selected for the SMART Station with a current limit of 32 A (40 A circuits) and at a voltage of 240 V. This was based on anticipated vehicle charging capacity, which is likely to be less than 10 kW for the foreseeable future, and to limit the required infrastructure for the overall system. A 240 V, 32 A EVSE can provide up to 7.68 kW of charge power. For an electric vehicle with a 0.24 kWh/mile energy usage and capable of charging at 7.68 kW, this represents roughly 32 miles (51.5 km) of range per hour of charge time. For the same vehicle, 6.6 kW charging represents 27.5 miles (44 km) of range per hour and 3.3 kW represents 13.8 miles (22 km) of range per hour. A system can also be structured to use 3 phase 208 Vac, but this requires phase load matching and, with the vehicles still being signal phase loads, results in a lower available power limit for vehicles of 6.66 kW.

There are a number of manufacturers of EVSE for public charging installations. Although the base design shows the use of an Eaton EVSE product, the design has been structured to allow substitution of any brand of EVSE. Minor modifications to the mechanical mounting scheme may be required, but the electrical infrastructure would remain unchanged. Elements of system control and data acquisition have been structured to use devices external to the EVSE, including the provision for separate revenue grade meters via standard meter sockets. There are EVSEs on the market that provide intelligence for control and communication, but the system is not currently designed to take advantage of these capabilities.

Features offered by commercially available EVSEs vary by manufacturer and model from simple metal enclosure boxes to elaborately shaped ergonomic designs with built-in intelligence. The EVSE's main function is to safely provide ac power to the vehicle and to properly implement the Society of Automotive Engineers (SAE) J1772 protocol for vehicle and EVSE interaction.

EVSEs have a cable that is used to connect to the vehicle. Stowing and management of the cable is considered to be a critical issue because the cable can be a trip hazard for station users if it is not properly stowed. EVSEs that are currently available generally rely on a cable that is stowed on the outside of the EVSE housing when not in use. The stowage is manual and requires that the user actively replace the cable usually by coiling the cable on a retaining hook. There are some recognized shortcomings in this scheme, and they will be assessed within our field trials of the base design. The addition of cable management, such as a reel mechanism, is possible but can add significantly to the cost and maintenance of EVSE hardware. Security of the charge cord is also a concern. Vandalism and copper theft are two primary shortcomings of having an exposed charge cable. To date, there are no commercial EVSE units that provide for secure storage of the charge cord.

Battery Storage

Early in the design process, it was recognized that batteries would require a climate-controlled space and, in some cases, ventilation for proper operation. This design effort has shown that the need for this climate-controlled space can have major cost implications for battery storage. The design described in this report shows that the addition of conditioned space essentially doubles the cost of the battery storage system.

A lithium-ion battery system was considered for the design, but initial research indicated that such a battery system with a capacity to meet the design goals was not available for purchase. Note that such a system would require an integrated battery management system and grid-tied inverter/charger. A lead acid battery system was finally selected based on availability and performance (power and energy capability) as well as longevity. The depth of discharge of a lead acid system is limited to something on the order of 50% for long life with repeated cycling. The actual capacity used in the base system design is roughly 167 kWh with a repeated cycle usable capacity of about 50 kWh.

The base design uses a set of 10 bidirectional grid tie inverters to connect the batteries to the grid. Ten units are required in order to support the 240 V ac system bus. The selected grid-tied inverter/charger system meets the requirements of UL 1741 for safety and provides an onboard data acquisition system for logging the data that are needed to support the full understanding of energy storage as it relates to the grid.

There are a number of other potential uses for the battery storage beyond ancillary services and local grid support. These include using battery energy to level the output of the solar array, reducing the peak system demand by dispatching energy to match vehicle load, and shifting the daytime station energy needs to night by storing battery energy at night and dispatching it during daylight hours.

A compelling reason for consideration of the use of lithium-ion batteries is the potential for second use of vehicle traction batteries. Vehicle manufacturers are looking for means to amortize the cost of traction batteries over a longer period of time in order to make the upfront cost of PEVs more acceptable to consumers. The potential to use “spent” traction batteries from vehicle applications may make the cost of such batteries very attractive for stationary storage use. There are many issues that need to be addressed in order to facilitate secondary use such as expected life of the batteries, failure mechanisms of older batteries, and recovery of functional cells from failed battery systems.

Solar Photovoltaic

In combining solar photovoltaic (PV) with a parking canopy, two primary design paths can be followed:

- An independent canopy with solar added on top.
- The solar panels form the canopy.

There are many different design paths that can be followed to develop a solar PV array integrated with a parking canopy. One key lesson learned in developing the design was related to the canopy/solar PV connection. There are products and designs that rely solely on the solar panels to form the actual roof-covering material for the canopy. Such products may be able to achieve a simpler mechanical design and also limit the issue of heat buildup under solar panels mounted above a roof structure, but there is one major drawback that must be considered. If the canopy consists solely of solar PV panels, then the amount of solar (and thus a major cost factor) is now tied to the sizing of the canopy. If the canopy size and solar PV sizing can be kept separate, this leaves open two degrees of freedom in cost control for the total design while simultaneously supporting a modular design function.

Selection of photovoltaic panels is based on a balance of performance and cost. The REC panels specified in the design, although not state of the art in efficiency, represent a cost-effective solution for the power levels sought in the system.

For the base design, assuming a location of Knoxville, Tennessee, the solar array performance is described in the following tables. Using a solar array power size of 20.5 kW with the National Renewable Energy Laboratory's PVWatts¹ calculator for Knoxville with a default loss of 23% from dc to ac and using the estimated yearly energy output, the array provides the output shown in Table 4-1.

¹ National Renewable Energy Laboratory, PVWatts link:
<http://rredc.nrel.gov/solar/calculators/PVWATTS/version1/US/Tennessee/Knoxville.html>

22.9 MWh/year or 62.8 kWh per day (average)

Table 4-1
PVWatts Calculations for Knoxville, Tennessee

PV System Specifications		Results		
Knoxville, TN		Month	Solar Radiation	Ac Energy
Dc Rating	20.5 KW		(kWh/m ² /day)	(kWh)
Dc to ac Derate Factor	0.77	1	2.38	1126
Ac Rating	25.4 kW	2	3.19	1371
Array Type	Fixed tilt	3	4.34	2028
Array Tilt	5.0°	4	5.30	2350
Array Azimuth	180.0°	5	5.72	2537
		6	6.20	2607
		7	6.06	2627
		8	5.42	2348
		9	4.55	1932
		10	3.94	1780
		11	2.70	1165
		12	2.29	1034
		Year	4.35	22905

Canopy

The canopy will consist of an open grid arrangement with a rain-protecting undergarment made of fully rated light steel. The design provides for support of the solar panels and gives a drip-free covering over the parking area. Figure 4-1 shows a side view of the design canopy.

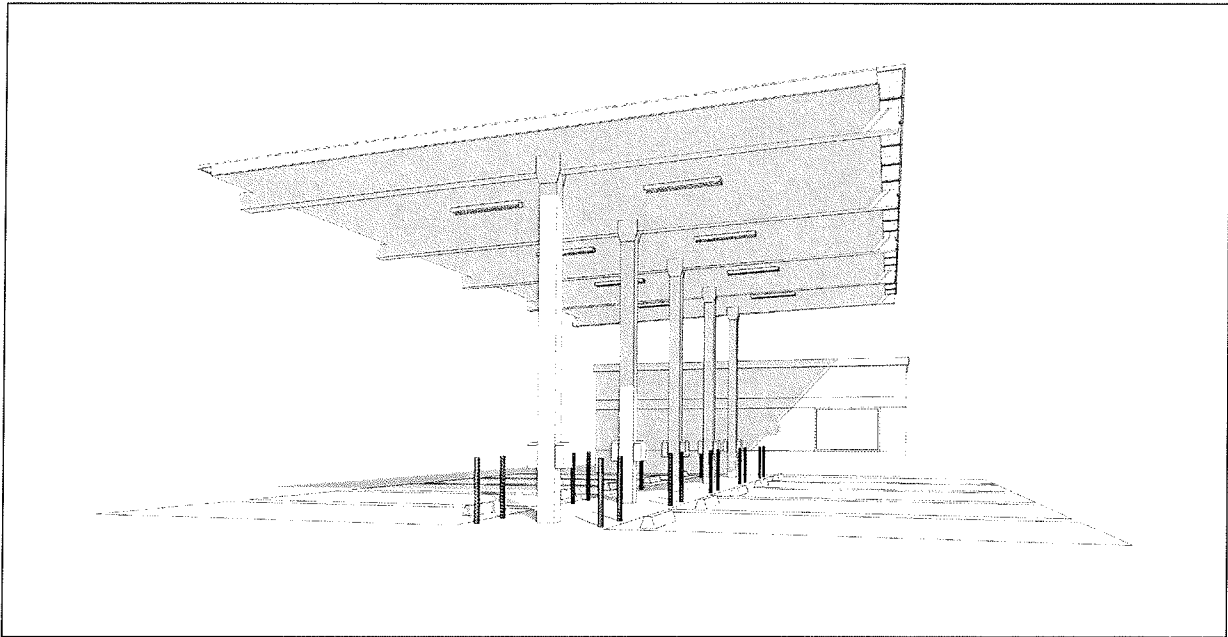


Figure 4-1
Outline View of the Canopy Structure

If electric vehicle parking is to be viewed as a type of “premier” parking, then the canopy should minimize rainwater dripping on users. When the canopy is made up solely of solar panels, the racking system requires gaps in between the panels to allow heat expansion. This also allows rain to drip through. In the case of the Sanyo HIT-style panels, which can be “see-through,” there are several guttered racking systems available that serve both purposes, but at a cost premium when compared to standard panels. The base design uses standard panels with a corrugated 26 GA – 7/8" sheet metal skin under the panels to control water runoff and eliminate dripping through the solar panels. An optional rain gutter and diverter was included in this design. It is located at the end of the canopy and can be added to control the resulting rain runoff. Use of the guttering system may be investigated as part of the initial prototype construction effort.

SMART Station Control Features

The inclusion of smart control features for the SMART Station has only been peripherally addressed in the design effort. Provision has been made for an overlay data acquisition system as well as sockets to install advance revenue meters at the site. Since the metering infrastructure will vary by utility, this approach was taken to provide for a wide range of advanced control options. A more detailed implementation of smart control features is planned for a prototype system which will be document in Volume two of this report.

Single-Row Design

During the design process of the SMART Station, a review of potential future sites for the stations made it obvious that there would be a need for a single-row canopy design in addition to

the nose-to-nose parking design described in this document. The single-row design was only partially developed, and a complete drawing package was not produced for the single row concept. Figures 4-2, 4-3, and 4-4 show the single-row concept applied to EPRI's Knoxville lab facility. The canopy design was developed to the point that the cantilever design presented represents an engineered solution.



Figure 4-2
Bird's Eye View of a Single-Row SMART Station at EPRI's Knoxville Facility

Modularity for the single-row design remains at the two-space level for all of the system elements except the canopy. Since the canopy supports are now located at the edge of the system, the number of supports will vary from a minimum of two up to five when going from a two-space to a ten-space single-row design. The hardware elements for the canopy remain nearly identical to the two-row concept.



Figure 4-3
Street-Level View of a Single-Row Design at EPRI's Knoxville Facility



Figure 4-4
View of the Station from the Building Entrance at EPRI's Knoxville Facility

Lessons Learned

Following is a bullet list of some of the lessons learned during this effort:

- Systems that provide features beyond simple vehicle charging come at a **cost premium**. Understanding how these costs will impact business case construction for a SMART Station is still to be determined.
- While there are more advanced **methods of coupling energy** from solar and battery systems for vehicle charging, such as the use of a DC bus to transfer power, **these may limit design flexibility**. Grid-tied systems offer more degrees of freedom when selecting hardware for the various sub-systems. For example, the battery DC bus voltage is not a design constraint when choosing a grid-tied battery system while it is if the battery DC bus **directly interfaces** with the solar array.
- A canopy constructed using only solar panels for the roof structure is typically not drip free. This may not meet the expectation of a typical consumer for a parking canopy.
- While the base design should be a valuable resource for someone **contemplating construction** of a SMART Station system, site variations must be considered in order to estimate the overall system cost and final construction form.

Design Selection and Lessons Learned

- Modularity provides flexibility in the design, but comes at a cost premium when compared to a system that is designed and optimized to a tight set of specifications.
- The need for a climate controlled space for a battery system greatly increases the cost of energy storage.
- When batteries are employed, additional hazards, such as fire or spills, must also be addressed in the design process.

Engaging an architect early in the design process is valuable in addressing the system aesthetics. This ensures a balance between engineering needs and a desired system look.

5

STRUCTURAL AND OTHER CONSIDERATIONS

All structures have been designed to be compliant with applicable federal regulations.

Foundation

Foundation criteria will be determined by the size of installation, grade topology, seismic zoning, and frost line. Drilled pier- or Sonotube²-type foundations will be used for the canopy with flat pad construction for the equipment shelter. A generic footer design is represented in the SMART Station base drawing set and should be revised related to local site conditions.

Seismic

Seismic qualifications will be determined by geographical location. Design criteria will be based on seismic zones, seismic performance categories, and seismic design categories. This design reflects compliance with International Building Code (IBC) 2003.

Lighting

The SMART Station base design reflects the fueling station model. As such, the light levels specified in the design are typical for retail fueling establishments. While these light levels may be appropriate for commercial areas, they are likely to be excessive if the station were to be located in a typical work location parking area. The lighting levels used under the canopy at a specific site should take into account the existing light levels used in the parking area adjacent to the station. Matching the station light levels with existing light levels ensures that the parking area will continue to look uniform. Having an overlighted section of a parking area tends to make other parts of the parking lot look dark due to the human eye's response to the light/dark contrast.

Wind

Wind loading will be determined by geographical location. Structures and associated equipment will be designed to withstand the code-specified wind load for its location. This design reflects compliance with IBC 2003.

² Sonotube is a registered trademark of Sonoco Products Company.

Storm Water Run-Off Control

The base design assumes that construction is occurring on an existing paved area. As such, no consideration for storm water run-off was included in the design. If the construction of a SMART Station is at a green field site, then the addition of nonpermeable surfaces and storm water run-off issues will need to be considered and addressed based on local building codes. In some areas, this might require the inclusion of a storm water detention pond or other run-off control features.

Canopy and System Element Heights

This design reflects height restrictions found in IBC 2000. It is closely modeled on canopies found at commercial fueling stations. A design that is based on a residential carport concept with a shorter height canopy is a possibility. This would likely have a minimal impact on the structural aspects of the canopy, but might improve the visual impact of a system design. The type of traffic that will be in proximity to the station should be carefully considered in relation to vehicle height and the hazard of a vehicle inadvertently striking the canopy. Canopy height selection may also be influenced by avoiding shadowing from nearby structures, vegetation, trees, and overhead power lines.

Vandalism

As with any public/outdoor infrastructure, it is expected that the SMART Station hardware will be subject to vandalism. The use of an enclosure to house a number of critical system elements should enhance system security. One potential issue that could become a major maintenance cost issue for charging stations is copper theft. Once it becomes generally known among copper thieves that the cables found on EVSE are inherently safe, theft of charge cable may become a routine problem. The use of security cameras as an integral part of the canopy structure may help to mitigate such vandalism. All system equipment should be designed and installed for outdoor use with enclosures and weatherproofing appropriate to public infrastructure.

Zoning

Zoning issues related to construction are generally written and enforced at the local level. A primary consideration when building codes are consulted is the defined “use” of the infrastructure to be built. For example, paving an area to allow for vehicle parking would have a defined use of parking. You could consult local zoning codes in reference to parking and find what rules and standards apply to a project. “Vehicle charging” is a use that is unlikely to have been defined in existing building codes. This situation is exacerbated when you combine a solar canopy and a battery storage building.

The base design as proposed in this document would be suitable for a broad range of locations from workplace to apartment complexes, but in appearance the SMART Station closely resembles a fueling station (canopy, “fuel pumps,” and a service building). A zoning board could choose to consider a SMART Station in a fashion similar to a parking canopy, or they might treat

it as a gas station based on retail sales. Each of these determinations would have a major impact on whether a given site is deemed suitable from a zoning perspective.

It is highly recommended that local codes enforcement and zoning officials be consulted early in the site selection and design process to provide guidance in defining system use. This may require providing details of anticipated system use, whether there will be fees collected for use of the system, and who the system users will be. Having clearly defined use early in the process will streamline the procurement of proper permits for system construction and may avoid the selection of a site that would prove to be unusable due to zoning issues.

When all of the elements described in this base design are combined, the full system begins to resemble a more conventional liquid fueling station. As such, when approaching the issue of zoning, the system “look” may contribute to limitations on location possibilities. This is based on the perception that, as a system, this base design more closely resembles a liquid fueling station than a parking area and may fall under retail zoning requirements for a given area. If the system use is defined as a fueling station, this might exclude it from being located in certain zoning types (such as a residential area).

Accessibility

In the United States, the installed configuration of public infrastructure must be designed to accommodate access by persons with disabilities. Under a federal law referred to as the Americans with Disabilities Act (ADA), there are carefully thought-out requirements that cover such issues as access to buildings, the mounting height of infrastructure, the location of ramps, and parking spaces specifically designed for accessibility. Vehicle charging is not specifically addressed in the ADA rules and guidelines as they currently exist; however, it is likely that the requirements will be modified to address vehicle charging in the future.

Rules from how an accessible space should be laid out, to how many spaces, if any, must be set aside for exclusive driver-with-disability use will need to be considered in constructing public infrastructure. As PEVs proliferate, the number of disabled drivers that will need access to charging will increase. It is recommended that charging station designers take a proactive stance in system layout, giving upfront consideration to accessibility early in the design process. Accessibility rules are generally interpreted and enforced at the local level with the federal ADA requirements as a baseline.

Tripping Hazards

The National Electric Code makes provision for the charge cord on an EVSE to be up to 25' (7.6 m) in length without cord management. The auto industry has not defined a standard for charge port location on vehicles. These two factors, when combined, will likely lead to the typical base installation of choice for an EVSE being one with a 25' (7.6 m) cord length.

For EVSE hardware currently available, cable management consists of requiring the charge station user to coil and hang the charge cable on a storage hook that is integral to the EVSE. It is easy to imagine that a station with ten 25' (7.6 m) long cords improperly stowed could present a

potential hazard for tripping. This is especially true for a public installation that has multiple EVSE-equipped charging spaces whether configured as nose-to-nose in this base design or in a single-row configuration.

For the base design, overhead cable management was considered but set aside due to cost and complexity. Field installations will need to be closely monitored to access the real potential for tripping hazards to develop on a deployed system. Adequate signage should also warn users of the potential risk.

6

SYSTEM COST BREAKDOWN

As part of the design effort, estimates of the cost of the various subsystems of the design have been carried out. These estimates are based on a mix of vendor quotes, design experience, and best guesses. This cost information has been used to scale the various system element costs. A very rough overall system cost estimate for the base design is in the range of \$0.9M to \$1.3M. Given that site-specific design issues and vendor pricing will depend on the products used and the sizing of the various subsystems, this should only be considered a ball-park figure.

Figure 6-1 shows the breakdown of subsystem costs as a percentage of the total hardware cost. The data are also provided in tabular form in Table 6-1. At first glance, solar PV is the primary cost driver of the system accounting for about 41% of the system hardware cost. Although the prefabricated building accounts for the next largest percentage at 24%, it needs to be noted that the use of battery storage drives the requirement for a conditioned space. Thus, a large part of the prefab building cost (approximately 20%) can be attributed to the battery storage system along with the grid-tied inverter/charger. When these elements are taken as a set, the lead acid battery system cost in this example accounts for about 39% of the hardware cost. Electrical equipment, the EVSEs, and advanced metering account for the remaining 16% of the total system hardware cost.

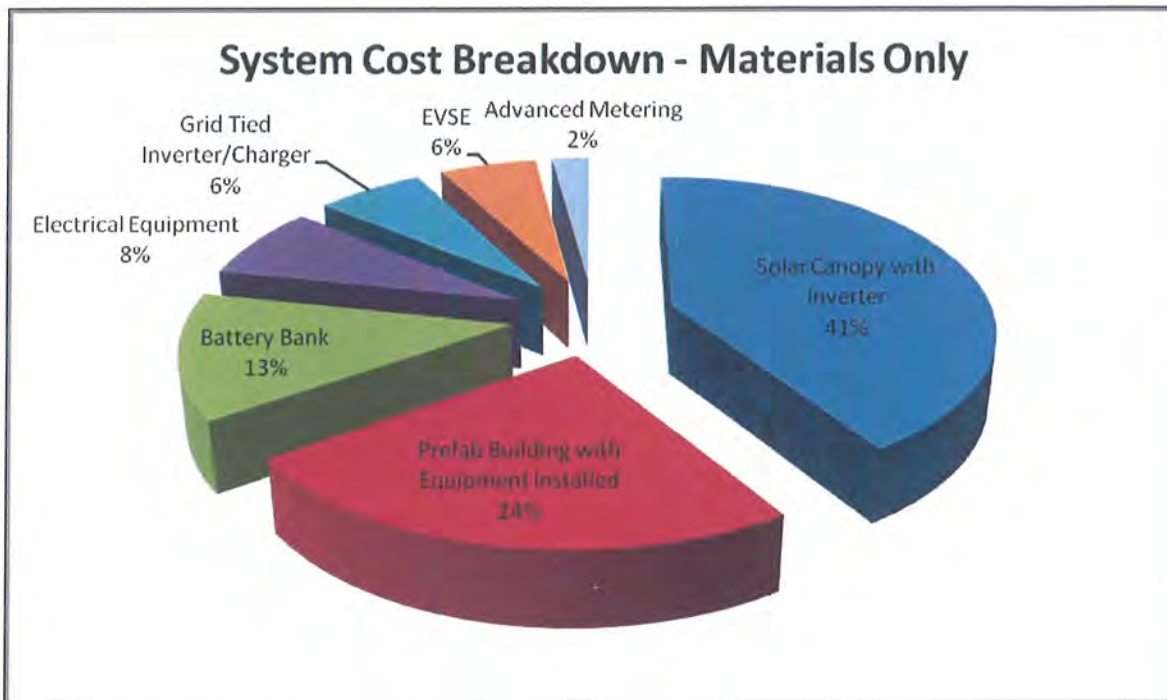


Figure 6-1
System Cost Breakdown by Major Subsystem

Table 6-1
Tabular System Hardware Cost Estimate Breakdown by Major Subsystem

Solar Canopy with Inverter	41%
Prefab Building with Equipment Installed	24%
Battery Bank	13%
Electrical Equipment	8%
Grid Tied Inverter/Charger	6%
EVSE	6%
Advanced Metering	2%

The design is modular in approach with two-vehicle charging spaces as the basic system element. This adds flexibility in meeting the needs of specific sites, such as available space. As such, the system elements can be readily scaled independently in order to drive the overall system cost. For a 10 space design, this results in increments of 20% of total capacity, or 5.1 kW solar increments and 10 kWh battery capacity increments.

When looking at total system cost, scaling of the solar PV array provides the strongest driver for cost control. Calculation of the impact of the solar array size is complicated by the fact that the area under canopy is determined by the number of parking spaces provided. As such, while the

cost is reduced by having a smaller total count of solar panels, canopy cost does not scale in direct proportion if the same number of parking spaces are provided.

Reducing the battery storage capacity can also drive a lower cost. While the battery itself accounts for about 13% of the system cost, scaling to a smaller battery will lower costs for the inverter/charger and the prefab building.

It is expected that there are diminishing returns involved in scaling with either the solar PV or battery systems. Overhead of base hardware and infrastructure drives the fact that using a half-size solar array does not reduce the cost impact of solar by a factor of two.

One of the difficulties of accessing the overall cost of the system is in pinning down the construction and installation costs, given that the use of a cross section of specialty technologies is involved. Although there are construction aspects related to the system installation, much of the work for the site would involve hardware installation that would typically be handled by an electrical contractor. For most electrical contractors, the system involves technologies that are likely to be outside their common installation experience. For three of the key system elements—solar PV, battery storage, and vehicle charging infrastructure—these technologies have remained in the realm of specialty installers, firms that generally only cover one of the technology areas. Finding a contractor that has experience with all three technologies in the near term is very unlikely. As such, the installation work for the full system may require the engagement of several contracting firms to cover each of these technology areas.

It is expected that there will be regional variations in labor rates, contractor markups, and construction practices along with site-specific issues that limit the ability to provide an accurate total installed system cost. Figure 6-2 is offered as a “straw man” cost breakdown for the complete system and is based on one possible overall system build scenario considered by Eaton. As is expected, the materials now account for a smaller proportion of the overall system cost. This again emphasizes that reduction of the sizing of one system element, while lowering the total system cost, does not reduce costs on a 1:1 basis.

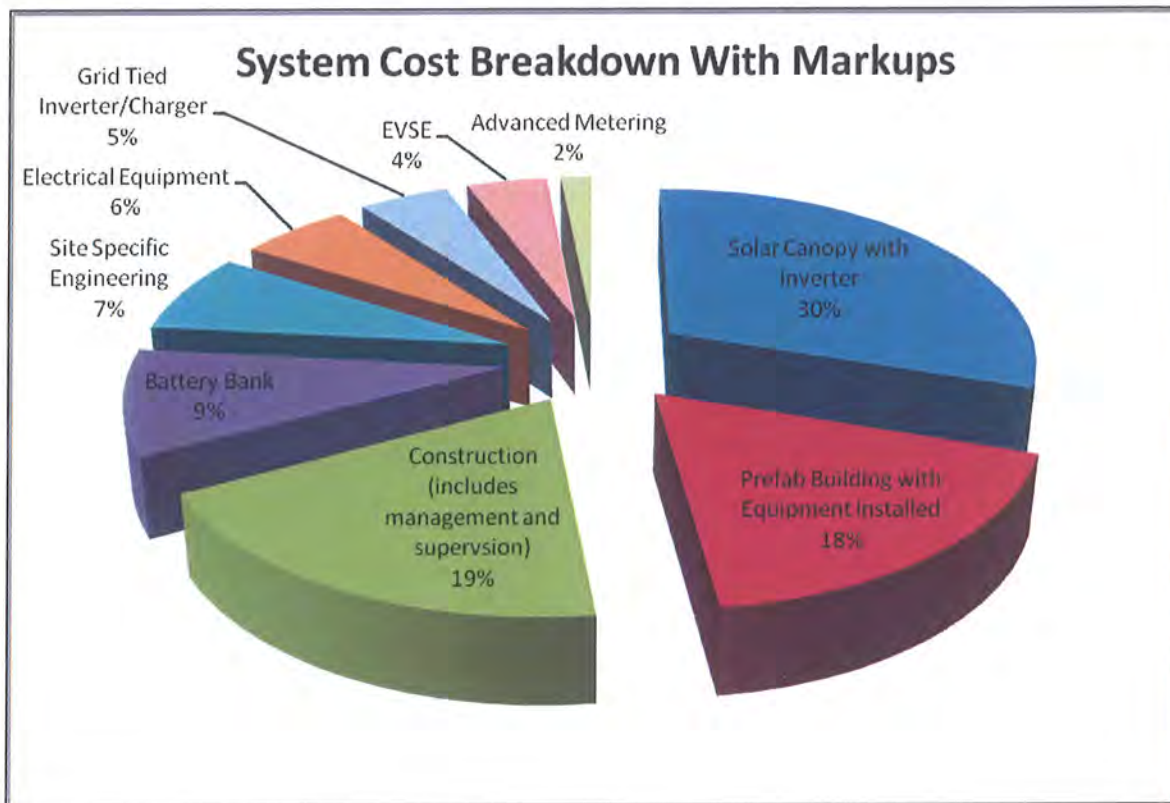


Figure 6-2
System Cost Breakdown When Construction Costs Are Included

In defining system cost impacts, a fundamental question must first be considered. Who is the “consumer” for the system? If viewed from a system level, that is, the SMART Station owner’s point of view, there are different considerations with respect cost and benefit. This is contrasted with the charging consumer’s perspective in relation to the cost of charging. Clearly, lowering the overall system cost has the potential of benefiting both the system owner/operator and the charging consumer.

For the system owner, the actual upfront system cost and expected maintenance costs are key factors to be considered. For the consumer, the bottom-line cost of the charging service is of primary concern. Given the limited experience base for both system installation and operation costs and the lack of a clear understanding of consumer behavior, assessing the economic viability of a system such as described in this base design remains to be determined.

What economic benefits does the system owner gain? What are the long-term impacts on reliability and maintenance related to the battery and solar arrays? Will consumers accept a premium fueling rate to use this system based on personal ethos and offset the cost for charging infrastructure as is described? Until systems are constructed and operated under real world conditions, answers to these questions will remain elusive.

Life cycle costs have not been considered in this effort. Maintenance and ongoing station support are difficult to estimate based on our current knowledge base. Life cycle costs will be addressed in future work with the construction of actual systems and data collection over time.

7

CONCLUSION

A base SMART Station design has been completed. While no single design can be made truly universal in application, the design presented in this report can be used as a basis for other public installations of similar vehicle charging stations. Site specifics related to trenching, zoning, and physical layout will all have an impact on a system design for a specific location. By completing a full design, a number of issues were addressed and key questions identified. Users can use data gathered in this effort to answer such questions as “Do I want battery storage in my charging station?” and “What benefits would a battery storage system offer”. A follow on effort based on actual construction of such a station will be documented in Volume two of this report.

A

DEFINITIONS AND ACRONYMS

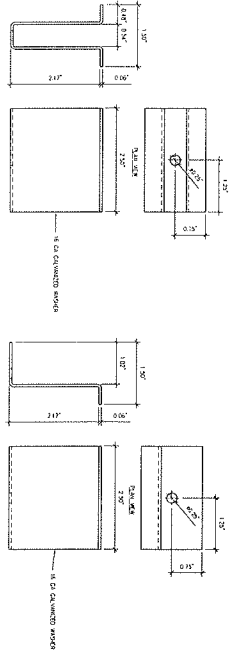
A	amp
AC	alternating current
ADA	Americans with Disabilities Act
AMI	advanced meter infrastructure
ANSI	American National Standards Institute
ARRA	American Recovery and Reinvestment Act of 2009
ART	area recharge terminal
BEV	battery electric vehicle
BMS	battery management system
DC	direct current
DOE	Department of Energy
DOT	Department of Transportation
EC	electrical contractor
EPRI	Electrical Power Research Institute
EV	electric vehicle
EVSE	electric vehicle supply equipment
FCC	Federal Communications Commission
GC	general contractor
HVAC	heating, ventilation, and air conditioning
HZ	hertz
IBC	International Building Code
IEEE	Institute of Electrical and Electronics Engineers
kWh	kilowatt hour
LAN	local area network
MPPT	maximum power point tracking
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
ORNL	Oak Ridge National Laboratory
PEV	plug-in electric vehicle
PHEV	plug-in hybrid electric vehicle
PV	photovoltaic
RF	radio frequency
SAE	Society of Automotive Engineers
SEP	Smart Energy Profile
SMART	Smart Modal Area Recharge Terminal
TVA	Tennessee Valley Authority
UL	Underwriters Laboratories, Inc.
V	volt
VA	volt amp

Definitions and Acronyms

VFD	variable frequency drive
VRLA	valve-regulated lead acid
WAN	wide area network

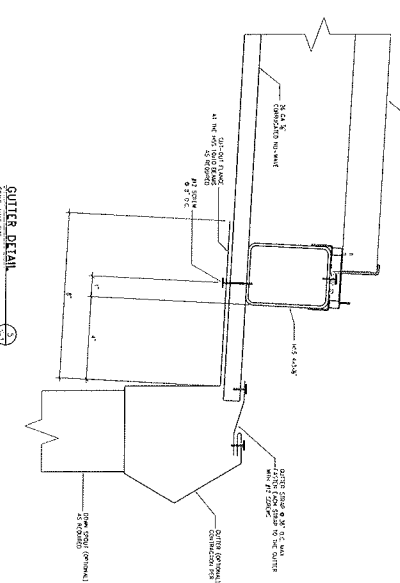
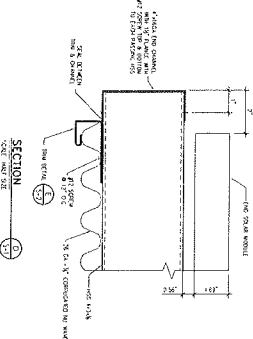
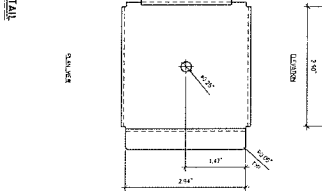
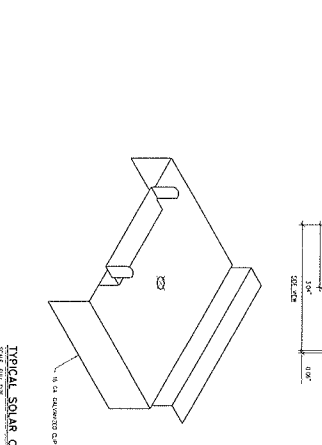
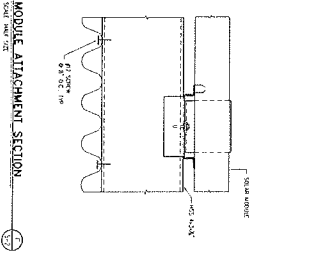
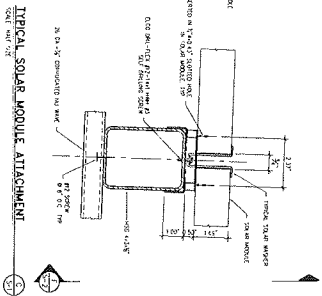
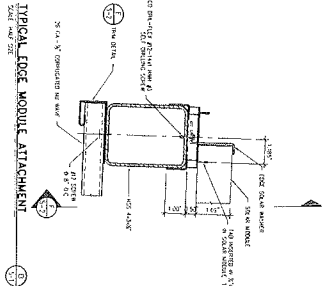
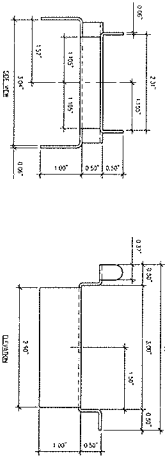
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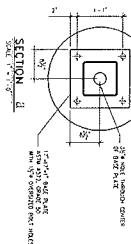
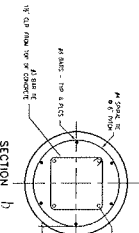
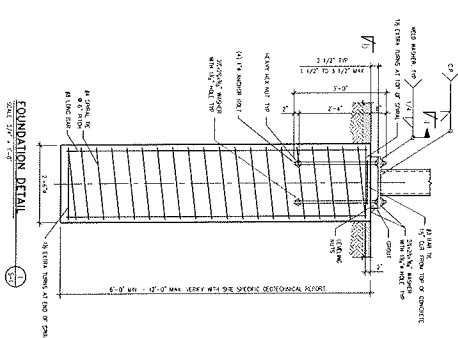
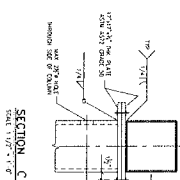
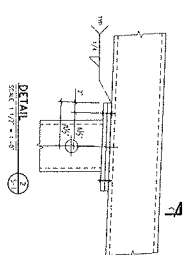
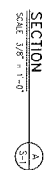
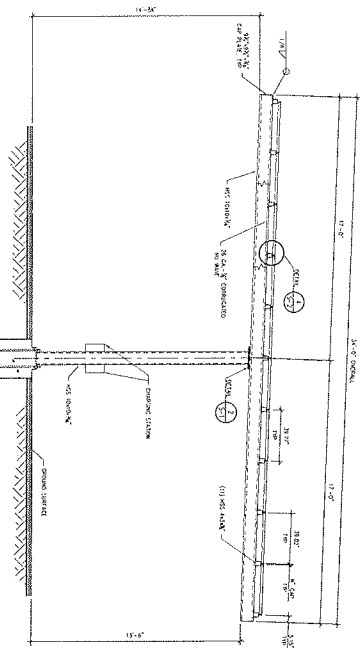
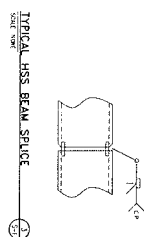
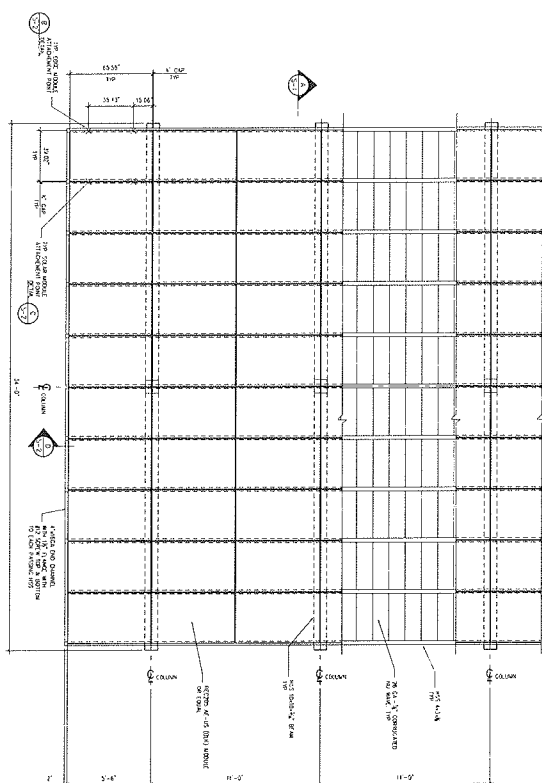
**CONSTRUCTION DRAWING SET WITH BILL OF
MATERIALS**



TYPICAL SOLAR WASHER DETAIL

EDGE SOLAR WASHER DETAIL

[illegible]



GENERAL NOTES:

1. CONCRETE SHALL BE 2800 PSI AND 60K REQUIREMENTS SHALL BE MET.
2. ALL CONCRETE SHALL BE PLACED AND FINISHED WITHIN 24 HOURS OF POURING.
3. ALL CONCRETE SHALL BE CURED FOR 7 DAYS.
4. ALL CONCRETE SHALL BE TESTED FOR STRENGTH AND CURING.
5. ALL CONCRETE SHALL BE TESTED FOR CURING.
6. ALL CONCRETE SHALL BE TESTED FOR CURING.
7. ALL CONCRETE SHALL BE TESTED FOR CURING.

CONCRETE NOTES:

1. CONCRETE SHALL BE 2800 PSI AND 60K REQUIREMENTS SHALL BE MET.
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5. ALL CONCRETE SHALL BE TESTED FOR CURING.
6. ALL CONCRETE SHALL BE TESTED FOR CURING.
7. ALL CONCRETE SHALL BE TESTED FOR CURING.

SEAL NOTES:

1. ALL SEALANTS SHALL BE 2800 PSI AND 60K REQUIREMENTS SHALL BE MET.
2. ALL SEALANTS SHALL BE PLACED AND FINISHED WITHIN 24 HOURS OF POURING.
3. ALL SEALANTS SHALL BE CURED FOR 7 DAYS.
4. ALL SEALANTS SHALL BE TESTED FOR STRENGTH AND CURING.
5. ALL SEALANTS SHALL BE TESTED FOR CURING.
6. ALL SEALANTS SHALL BE TESTED FOR CURING.
7. ALL SEALANTS SHALL BE TESTED FOR CURING.

SEAL INSPECTIONS:

1. ALL SEALANTS SHALL BE 2800 PSI AND 60K REQUIREMENTS SHALL BE MET.
2. ALL SEALANTS SHALL BE PLACED AND FINISHED WITHIN 24 HOURS OF POURING.
3. ALL SEALANTS SHALL BE CURED FOR 7 DAYS.
4. ALL SEALANTS SHALL BE TESTED FOR STRENGTH AND CURING.
5. ALL SEALANTS SHALL BE TESTED FOR CURING.
6. ALL SEALANTS SHALL BE TESTED FOR CURING.
7. ALL SEALANTS SHALL BE TESTED FOR CURING.

CONCRETE NOTES:

1. IN DESIGNER'S NAME SHALL CEMENT BE NO. 2 OR 3 PER 142827 (SECTION 2)
2. CONCRETE SHALL BE 3000 PSI PER DAY (CONCRETE PRACTICE)
3. SLAB OF 10" @
4. 12" @ 18" @ 24" @ 30" @ 36" @ 42" @ 48" @ 54" @ 60" @ 66" @ 72" @ 78" @ 84" @ 90" @ 96" @ 102" @ 108" @ 114" @ 120" @ 126" @ 132" @ 138" @ 144" @ 150" @ 156" @ 162" @ 168" @ 174" @ 180" @ 186" @ 192" @ 198" @ 204" @ 210" @ 216" @ 222" @ 228" @ 234" @ 240" @ 246" @ 252" @ 258" @ 264" @ 270" @ 276" @ 282" @ 288" @ 294" @ 300" @ 306" @ 312" @ 318" @ 324" @ 330" @ 336" @ 342" @ 348" @ 354" @ 360" @ 366" @ 372" @ 378" @ 384" @ 390" @ 396" @ 402" @ 408" @ 414" @ 420" @ 426" @ 432" @ 438" @ 444" @ 450" @ 456" @ 462" @ 468" @ 474" @ 480" @ 486" @ 492" @ 498" @ 504" @ 510" @ 516" @ 522" @ 528" @ 534" @ 540" @ 546" @ 552" @ 558" @ 564" @ 570" @ 576" @ 582" @ 588" @ 594" @ 600" @ 606" @ 612" @ 618" @ 624" @ 630" @ 636" @ 642" @ 648" @ 654" @ 660" @ 666" @ 672" @ 678" @ 684" @ 690" @ 696" @ 702" @ 708" @ 714" @ 720" @ 726" @ 732" @ 738" @ 744" @ 750" @ 756" @ 762" @ 768" @ 774" @ 780" @ 786" @ 792" @ 798" @ 804" @ 810" @ 816" @ 822" @ 828" @ 834" @ 840" @ 846" @ 852" @ 858" @ 864" @ 870" @ 876" @ 882" @ 888" @ 894" @ 900" @ 906" @ 912" @ 918" @ 924" @ 930" @ 936" @ 942" @ 948" @ 954" @ 960" @ 966" @ 972" @ 978" @ 984" @ 990" @ 996" @ 1002" @ 1008" @ 1014" @ 1020" @ 1026" @ 1032" @ 1038" @ 1044" @ 1050" @ 1056" @ 1062" @ 1068" @ 1074" @ 1080" @ 1086" @ 1092" @ 1098" @ 1104" @ 1110" @ 1116" @ 1122" @ 1128" @ 1134" @ 1140" @ 1146" @ 1152" @ 1158" @ 1164" @ 1170" @ 1176" @ 1182" @ 1188" @ 1194" @ 1200" @ 1206" @ 1212" @ 1218" @ 1224" @ 1230" @ 1236" @ 1242" @ 1248" @ 1254" @ 1260" @ 1266" @ 1272" @ 1278" @ 1284" @ 1290" @ 1296" @ 1302" @ 1308" @ 1314" @ 1320" @ 1326" @ 1332" @ 1338" @ 1344" @ 1350" @ 1356" @ 1362" @ 1368" @ 1374" @ 1380" @ 1386" @ 1392" @ 1398" @ 1404" @ 1410" @ 1416" @ 1422" @ 1428" @ 1434" @ 1440" @ 1446" @ 1452" @ 1458" @ 1464" @ 1470" @ 1476" @ 1482" @ 1488" @ 1494" @ 1500" @ 1506" @ 1512" @ 1518" @ 1524" @ 1530" @ 1536" @ 1542" @ 1548" @ 1554" @ 1560" @ 1566" @ 1572" @ 1578" @ 1584" @ 1590" @ 1596" @ 1602" @ 1608" @ 1614" @ 1620" @ 1626" @ 1632" @ 1638" @ 1644" @ 1650" @ 1656" @ 1662" @ 1668" @ 1674" @ 1680" @ 1686" @ 1692" @ 1698" @ 1704" @ 1710" @ 1716" @ 1722" @ 1728" @ 1734" @ 1740" @ 1746" @ 1752" @ 1758" @ 1764" @ 1770" @ 1776" @ 1782" @ 1788" @ 1794" @ 1800" @ 1806" @ 1812" @ 1818" @ 1824" @ 1830" @ 1836" @ 1842" @ 1848" @ 1854" @ 1860" @ 1866" @ 1872" @ 1878" @ 1884" @ 1890" @ 1896" @ 1902" @ 1908" @ 1914" @ 1920" @ 1926" @ 1932" @ 1938" @ 1944" @ 1950" @ 1956" @ 1962" @ 1968" @ 1974" @ 1980" @ 1986" @ 1992" @ 1998" @ 2004" @ 2010" @ 2016" @ 2022" @ 2028" @ 2034" @ 2040" @ 2046" @ 2052" @ 2058" @ 2064" @ 2070" @ 2076" @ 2082" @ 2088" @ 2094" @ 2100" @ 2106" @ 2112" @ 2118" @ 2124" @ 2130" @ 2136" @ 2142" @ 2148" @ 2154" @ 2160" @ 2166" @ 2172" @ 2178" @ 2184" @ 2190" @ 2196" @ 2202" @ 2208" @ 2214" @ 2220" @ 2226" @ 2232" @ 2238" @ 2244" @ 2250" @ 2256" @ 2262" @ 2268" @ 2274" @ 2280" @ 2286" @ 2292" @ 2298" @ 2304" @ 2310" @ 2316" @ 2322" @ 2328" @ 2334" @ 2340" @ 2346" @ 2352" @ 2358" @ 2364" @ 2370" @ 2376" @ 2382" @ 2388" @ 2394" @ 2400" @ 2406" @ 2412" @ 2418" @ 2424" @ 2430" @ 2436" @ 2442" @ 2448" @ 2454" @ 2460" @ 2466" @ 2472" @ 2478" @ 2484" @ 2490" @ 2496" @ 2502" @ 2508" @ 2514" @ 2520" @ 2526" @ 2532" @ 2538" @ 2544" @ 2550" @ 2556" @ 2562" @ 2568" @ 2574" @ 2580" @ 2586" @ 2592" @ 2598" @ 2604" @ 2610" @ 2616" @ 2622" @ 2628" @ 2634" @ 2640" @ 2646" @ 2652" @ 2658" @ 2664" @ 2670" @ 2676" @ 2682" @ 2688" @ 2694" @ 2700" @ 2706" @ 2712" @ 2718" @ 2724" @ 2730" @ 2736" @ 2742" @ 2748" @ 2754" @ 2760" @ 2766" @ 2772" @ 2778" @ 2784" @ 2790" @ 2796" @ 2802" @ 2808" @ 2814" @ 2820" @ 2826" @ 2832" @ 2838" @ 2844" @ 2850" @ 2856" @ 2862" @ 2868" @ 2874" @ 2880" @ 2886" @ 2892" @ 2898" @ 2904" @ 2910" @ 2916" @ 2922" @ 2928" @ 2934" @ 2940" @ 2946" @ 2952" @ 2958" @ 2964" @ 2970" @ 2976" @ 2982" @ 2988" @ 2994" @ 3000" @ 3006" @ 3012" @ 3018" @ 3024" @ 3030" @ 3036" @ 3042" @ 3048" @ 3054" @ 3060" @ 3066" @ 3072" @ 3078" @ 3084" @ 3090" @ 3096" @ 3102" @ 3108" @ 3114" @ 3120" @ 3126" @ 3132" @ 3138" @ 3144" @ 3150" @ 3156" @ 3162" @ 3168" @ 3174" @ 3180" @ 3186" @ 3192" @ 3198" @ 3204" @ 3210" @ 3216" @ 3222" @ 3228" @ 3234" @ 3240" @ 3246" @ 3252" @ 3258" @ 3264" @ 3270" @ 3276" @ 3282" @ 3288" @ 3294" @ 3300" @ 3306" @ 3312" @ 3318" @ 3324" @ 3330" @ 3336" @ 3342" @ 3348" @ 3354" @ 3360" @ 3366" @ 3372" @ 3378" @ 3384" @ 3390" @ 3396" @ 3402" @ 3408" @ 3414" @ 3420" @ 3426" @ 3432" @ 3438" @ 3444" @ 3450" @ 3456" @ 3462" @ 3468" @ 3474" @ 3480" @ 3486" @ 3492" @ 3498" @ 3504" @ 3510" @ 3516" @ 3522" @ 3528" @ 3534" @ 3540" @ 3546" @ 3552" @ 3558" @ 3564" @ 3570" @ 3576" @ 3582" @ 3588" @ 35

STEEL NOTES:

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BUILDING CODES AND STANDARDS: 2008 INTERNATIONAL BUILDING CODE ICC 2008

CODE ANALYSIS:

THE FOLLOWING TABLE PROVIDES A SUMMARY OF THE BUILDING CODES AND STANDARDS THAT APPLY TO THIS PROJECT. THE TABLE IS BASED ON THE BUILDING CODES AND STANDARDS THAT WERE IN EFFECT AT THE TIME OF THE DESIGN OF THIS PROJECT. THE BUILDING CODES AND STANDARDS MAY BE UPDATED FROM TIME TO TIME. THE BUILDING CODES AND STANDARDS SHOULD BE CHECKED FOR ANY UPDATES BEFORE THE PROJECT IS CONSTRUCTED.

NOTES:

1. THE BUILDING CODES AND STANDARDS THAT APPLY TO THIS PROJECT ARE THE 2008 INTERNATIONAL BUILDING CODE (ICC 2008) AND THE 2008 INTERNATIONAL ELECTRICAL CODE (IEC 2008).
2. THE BUILDING CODES AND STANDARDS THAT APPLY TO THIS PROJECT ARE THE 2008 INTERNATIONAL BUILDING CODE (ICC 2008) AND THE 2008 INTERNATIONAL ELECTRICAL CODE (IEC 2008).
3. THE BUILDING CODES AND STANDARDS THAT APPLY TO THIS PROJECT ARE THE 2008 INTERNATIONAL BUILDING CODE (ICC 2008) AND THE 2008 INTERNATIONAL ELECTRICAL CODE (IEC 2008).

INTERIOR FINISHES SCHEDULE:

ROOM #	ROOM NAME	CEILING	WALLS	FLOOR	DOOR	WINDOW
1	ENTRY	CEILING	WALLS	FLOOR	DOOR	WINDOW
2	BATTERY ROOM	CEILING	WALLS	FLOOR	DOOR	WINDOW
3	CHARGING STATION	CEILING	WALLS	FLOOR	DOOR	WINDOW

DOOR SCHEDULE:

DOOR #	DOOR NAME	DOOR TYPE	DOOR MATERIAL	DOOR FINISH
1	ENTRY	DOOR	DOOR MATERIAL	DOOR FINISH
2	BATTERY ROOM	DOOR	DOOR MATERIAL	DOOR FINISH
3	CHARGING STATION	DOOR	DOOR MATERIAL	DOOR FINISH

WINDOW SCHEDULE:

WINDOW #	WINDOW NAME	WINDOW TYPE	WINDOW MATERIAL	WINDOW FINISH
1	ENTRY	WINDOW	WINDOW MATERIAL	WINDOW FINISH
2	BATTERY ROOM	WINDOW	WINDOW MATERIAL	WINDOW FINISH
3	CHARGING STATION	WINDOW	WINDOW MATERIAL	WINDOW FINISH

EXTERIOR FINISHES SCHEDULE:

THE FOLLOWING TABLE PROVIDES A SUMMARY OF THE EXTERIOR FINISHES THAT APPLY TO THIS PROJECT. THE TABLE IS BASED ON THE EXTERIOR FINISHES THAT WERE IN EFFECT AT THE TIME OF THE DESIGN OF THIS PROJECT. THE EXTERIOR FINISHES MAY BE UPDATED FROM TIME TO TIME. THE EXTERIOR FINISHES SHOULD BE CHECKED FOR ANY UPDATES BEFORE THE PROJECT IS CONSTRUCTED.

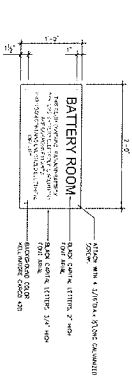
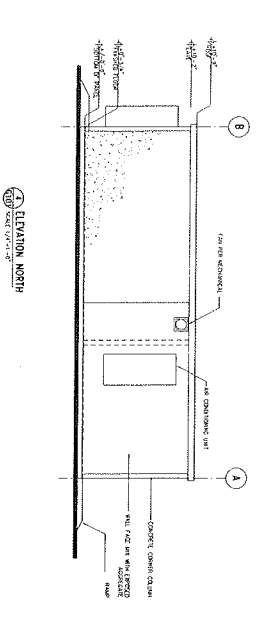
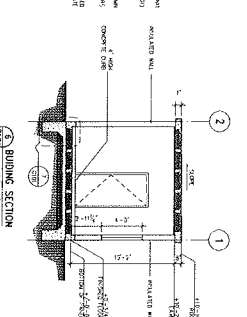
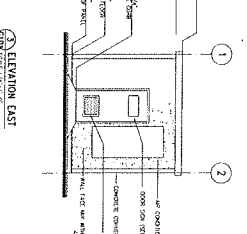
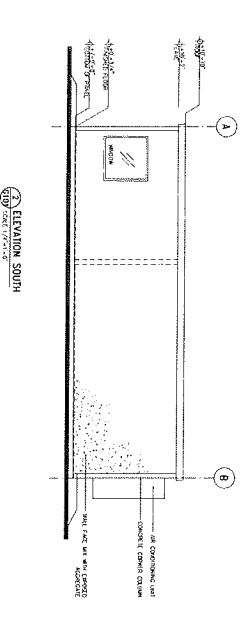
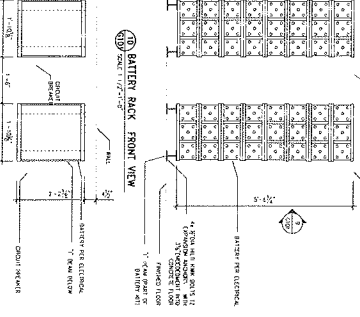
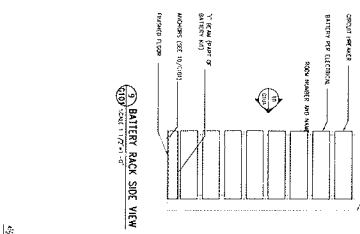
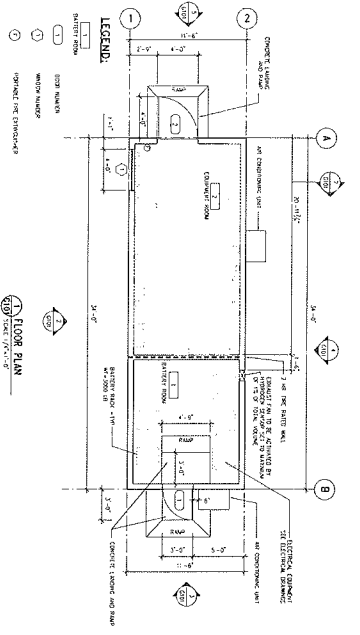
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THE FOUNDATION DETAIL IS BASED ON THE FOUNDATION DETAIL THAT WAS IN EFFECT AT THE TIME OF THE DESIGN OF THIS PROJECT. THE FOUNDATION DETAIL MAY BE UPDATED FROM TIME TO TIME. THE FOUNDATION DETAIL SHOULD BE CHECKED FOR ANY UPDATES BEFORE THE PROJECT IS CONSTRUCTED.

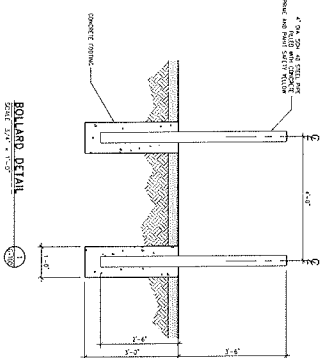
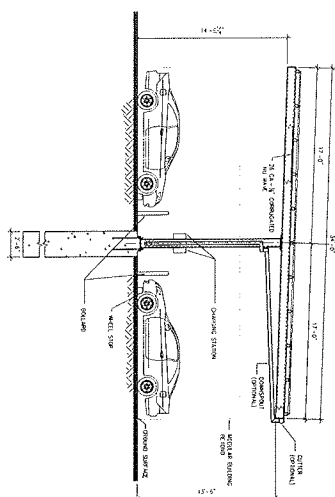
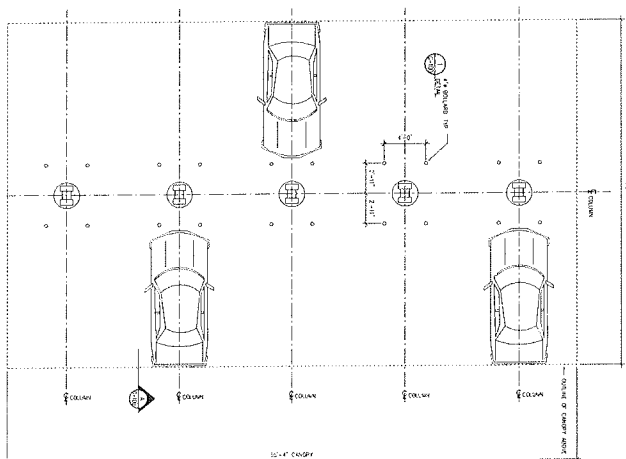
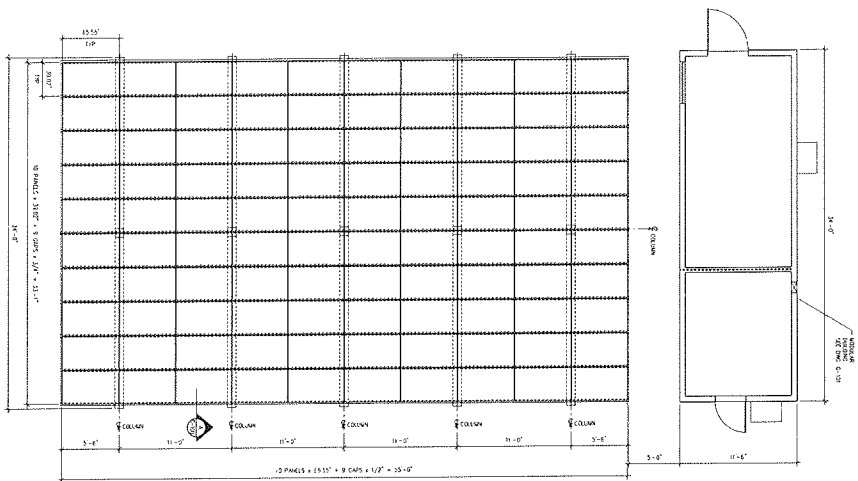
E-TON
POWERING BUSINESS VOLUTIONS


SOLAR-ASSISTED PLUG-IN ELECTRIC VEHICLE CHARGING STATION

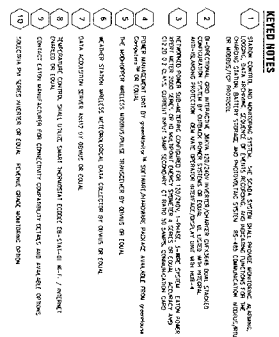
RELOCATABLE BUILDING



2008 STORAGE PER IFC 604.7

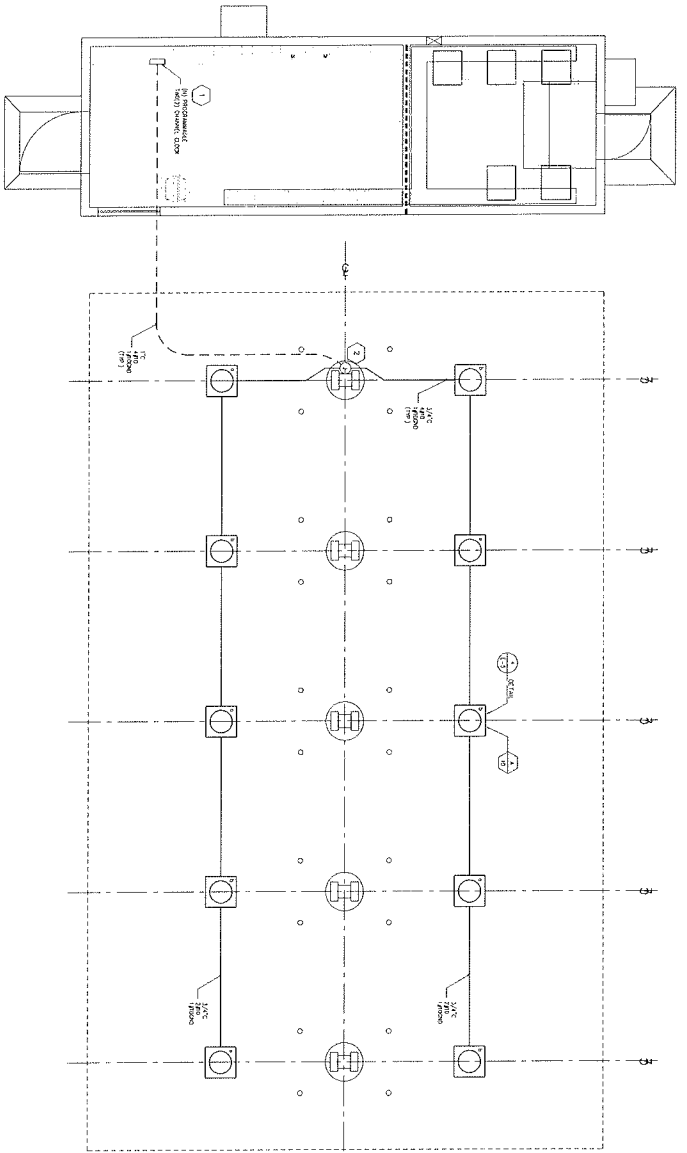


 EATON POWERING BUSINESS WORLDWIDE 17000 E. McDowell Rd. Mesa, AZ 85205-5090 Phone: 480/841-2000 Fax: 480/841-2001 E-mail: info@eaton.com									
Date: <input type="text"/>		Sales Rep: <input type="text"/>		Order No: <input type="text"/>		Order Date: <input type="text"/>		Order Qty: <input type="text"/>	
Customer Name: <input type="text"/>		Customer Address: <input type="text"/>		Customer City: <input type="text"/>		Customer State: <input type="text"/>		Customer Zip: <input type="text"/>	
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Order Description: <input type="text"/>		Order Quantity: <input type="text"/>		Order Price: <input type="text"/>		Order Total: <input type="text"/>		Order Status: <input type="text"/>	
Order Comments: <input type="text"/>		Order Remarks: <input type="text"/>		Order Notes: <input type="text"/>		Order Footer: <input type="text"/>		Order Signature: <input type="text"/>	



CAUTION: THIS PLAN MAY BE PROTECTED

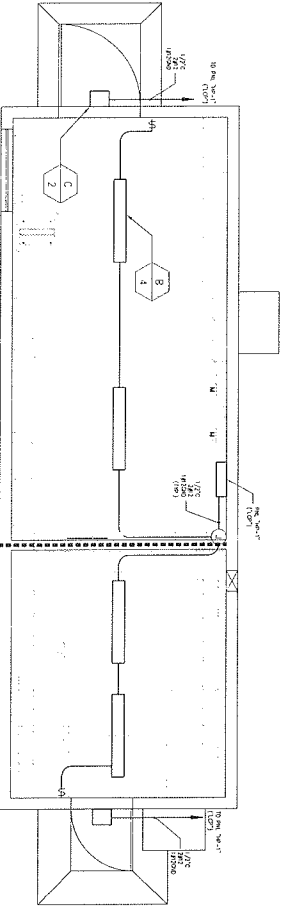
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CANOPY LIGHTING PLAN
Scale: 1/8" = 1'-0"

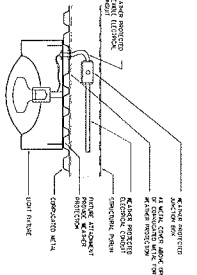
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29.0	36.8	42.0	45.4	47.6	48.3	49.1	49.3	48.6	47.9	45.8	42.5	29.8
33.8	43.1	49.2	53.5	57.4	56.4	55.9	58.6	56.8	57.4	53.9	49.7	34.9
35.2	44.8	51.3	55.4	58.0	59.1	58.9	60.1	59.4	58.4	55.9	51.9	38.3
35.5	44.6	51.6	55.7	57.9	59.6	60.1	60.1	59.9	58.3	56.0	52.2	38.5
35.2	44.8	51.3	55.4	58.0	59.1	58.9	60.1	59.4	58.4	55.9	51.9	38.3
33.6	43.1	49.2	53.5	57.4	56.4	55.9	58.6	56.8	57.4	53.9	49.7	34.9
28.7	36.4	41.6	44.9	47.1	47.9	48.6	48.0	47.2	45.2	42.0	37.0	24.5
21.7	26.9	31.0	33.4	34.9	36.0	36.3	36.3	36.0	35.0	33.6	31.3	27.4

LUMINANCE LEVEL
STATISTICAL
457°C
467°C
467°C
27.1°C



BUILDING LIGHTING PLAN
Scale: 1/8" = 1'-0"

CANOPY FIXTURE MOUNTING DETAIL
Scale: 1/8" = 1'-0"



Item	Quantity	Description	Unit	Notes
1	12	RECESSED CANOPY LIGHTING FIXTURES	EA	12000 LUMENS, 5000K, 120V, 150W, 12" x 12"
2	12	RECESSED CANOPY LIGHTING FIXTURES	EA	12000 LUMENS, 5000K, 120V, 150W, 12" x 12"
3	12	RECESSED CANOPY LIGHTING FIXTURES	EA	12000 LUMENS, 5000K, 120V, 150W, 12" x 12"

GENERAL NOTES

1. ALL DIMENSIONS SHALL BE AS SHOWN.
2. PROVIDE 1/2" MIN. CLEARANCE BETWEEN LIGHTS.
3. PROVIDE 1/2" MIN. CLEARANCE BETWEEN LIGHTS.

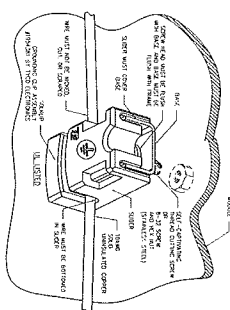
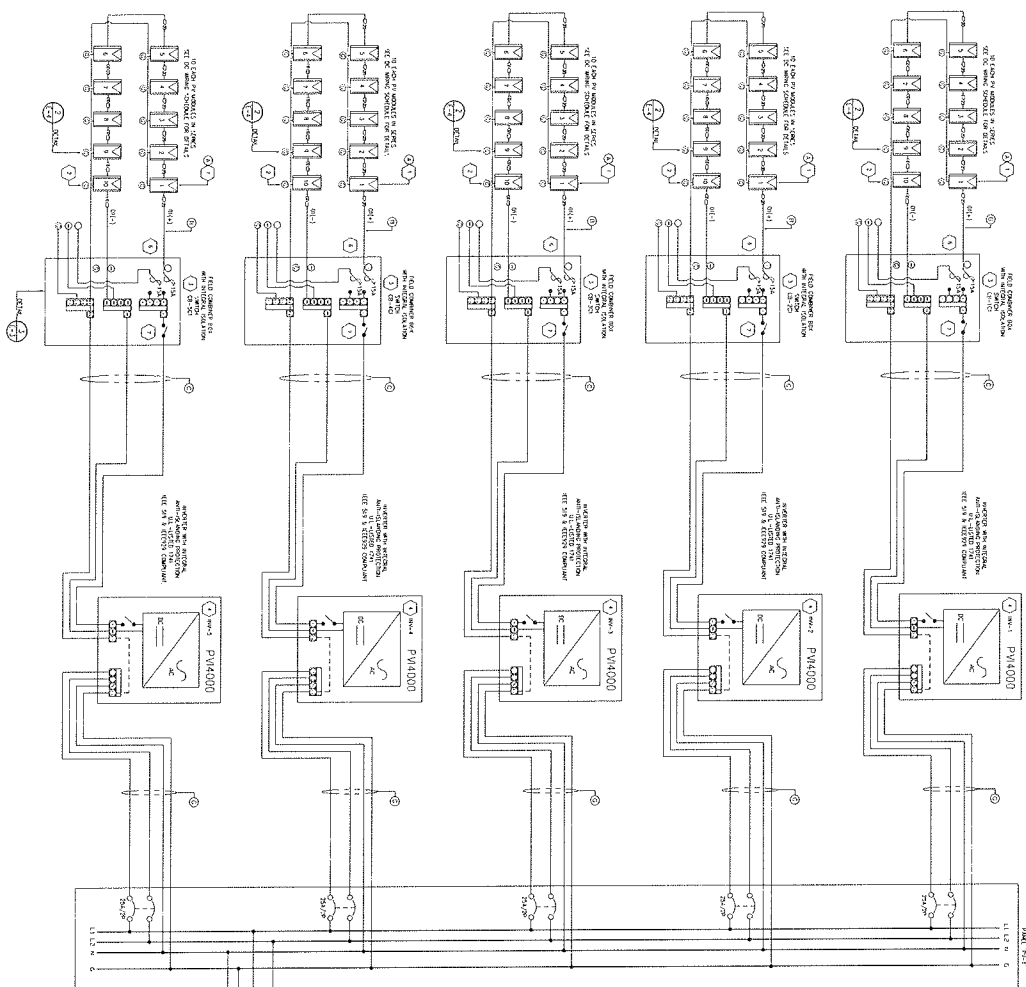
KEYNOTES

1. PROVIDE 1/2" MIN. CLEARANCE BETWEEN LIGHTS.
2. PROVIDE 1/2" MIN. CLEARANCE BETWEEN LIGHTS.
3. PROVIDE 1/2" MIN. CLEARANCE BETWEEN LIGHTS.

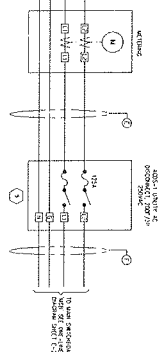
CANOPY LIGHTING PHOTOMETRIC CALCULATION

CANOPY LIGHTING PHOTOMETRIC CALCULATION

DATE	12/19/2023	BY	12/19/2023	REVISION	1
PROJECT	SOLAR-ASSISTED PLUG-IN ELECTRIC VEHICLE CHARGING SITE	LOCATION	CHARGING SITE	DATE	12/19/2023
CLIENT	BLUMER	PROJECT	CHARGING SITE	DATE	12/19/2023
DESIGNER	BLUMER	PROJECT	CHARGING SITE	DATE	12/19/2023
CHECKER	BLUMER	PROJECT	CHARGING SITE	DATE	12/19/2023
APPROVER	BLUMER	PROJECT	CHARGING SITE	DATE	12/19/2023
DATE	12/19/2023	BY	12/19/2023	REVISION	1
PROJECT	SOLAR-ASSISTED PLUG-IN ELECTRIC VEHICLE CHARGING SITE	LOCATION	CHARGING SITE	DATE	12/19/2023
CLIENT	BLUMER	PROJECT	CHARGING SITE	DATE	12/19/2023
DESIGNER	BLUMER	PROJECT	CHARGING SITE	DATE	12/19/2023
CHECKER	BLUMER	PROJECT	CHARGING SITE	DATE	12/19/2023
APPROVER	BLUMER	PROJECT	CHARGING SITE	DATE	12/19/2023



MODULE FRAME GRIDDING
SAC: NIS



KEYED NOTES

- [illegible]

GENERAL NOTES

ALLOWABLE MAXIMUM AMPACITIES SCHEDULE 40

ALLOWABLE MAXIMUM AESTHETIC SCHEDULE									
WATER USE	WATER QUALITY	WATER QUANTITY	WATER QUALITY	WATER QUANTITY	WATER QUALITY	WATER QUANTITY	WATER QUALITY	WATER QUANTITY	WATER QUALITY
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
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9	9	9	9	9	9	9	9	9	9
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43	43	43	43	43	43	43	43	43	43
44	44	44	44	44	44	44	44	44	44
45	45	45	45	45	45	45	45	45	45
46	46	46	46	46	46	46	46	46	46

PV SYSTEM WIRING DIAGRAM



CAUTION: THIS FLAMMABLE GAS IS PRODUCED

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6. Varian, J. (1999) *Microeconomic Analysis* (3rd edn). W. W. Norton & Co., New York.

[illegible][illegible]

PAIN ENTHREE (M)											
DATE	TIME	LOCATION	TYPE	SEVERITY	CHARACTER	ONSET	DURATION	TRIGGER	RELIEF	REMARKS	DOCTOR'S SIGNATURE
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10/10/2023	11:00 AM	Room 101	Headache	6/10	Throbbing	10:30 AM	10 mins	Stress	Rest		
10/10/2023	11:30 AM	Room 101	Headache	5/10	Throbbing	11:00 AM	10 mins	Stress	Rest		
10/10/2023	12:00 PM	Room 101	Headache	4/10	Throbbing	11:30 AM	10 mins	Stress	Rest		
10/10/2023	12:30 PM	Room 101	Headache	3/10	Throbbing	12:00 PM	10 mins	Stress	Rest		
10/10/2023	1:00 PM	Room 101	Headache	2/10	Throbbing	12:30 PM	10 mins	Stress	Rest		
10/10/2023	1:30 PM	Room 101	Headache	1/10	Throbbing	1:00 PM	10 mins	Stress	Rest		
10/10/2023	2:00 PM	Room 101	Headache	1/10	Throbbing	1:30 PM	10 mins	Stress	Rest		
10/10/2023	2:30 PM	Room 101	Headache	1/10	Throbbing	2:00 PM	10 mins	Stress	Rest		
10/10/2023	3:00 PM	Room 101	Headache	1/10	Throbbing	2:30 PM	10 mins	Stress	Rest		
10/10/2023	3:30 PM	Room 101	Headache	1/10	Throbbing	3:00 PM	10 mins	Stress	Rest		
10/10/2023	4:00 PM	Room 101	Headache	1/10	Throbbing	3:30 PM	10 mins	Stress	Rest		
10/10/2023	4:30 PM	Room 101	Headache	1/10	Throbbing	4:00 PM	10 mins	Stress	Rest		
10/10/2023	5:00 PM	Room 101	Headache	1/10	Throbbing	4:30 PM	10 mins	Stress	Rest		
10/10/2023	5:30 PM	Room 101	Headache	1/10	Throbbing	5:00 PM	10 mins	Stress	Rest		
10/10/2023	6:00 PM	Room 101	Headache	1/10	Throbbing	5:30 PM	10 mins	Stress	Rest		
10/10/2023	6:30 PM	Room 101	Headache	1/10	Throbbing	6:00 PM	10 mins	Stress	Rest		
10/10/2023	7:00 PM	Room 101	Headache	1/10	Throbbing	6:30 PM	10 mins	Stress	Rest		
10/10/2023	7:30 PM	Room 101	Headache	1/10	Throbbing	7:00 PM	10 mins	Stress	Rest		
10/10/2023	8:00 PM	Room 101	Headache	1/10	Throbbing	7:30 PM	10 mins	Stress	Rest		
10/10/2023	8:30 PM	Room 101	Headache	1/10	Throbbing	8:00 PM	10 mins	Stress	Rest		
10/10/2023	9:00 PM	Room 101	Headache	1/10	Throbbing	8:30 PM	10 mins	Stress	Rest		
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10/10/2023	1:30 AM	Room 101	Headache	1/10	Throbbing	1:00 AM	10 mins	Stress	Rest		
10/10/2023	2:00 AM	Room 101	Headache	1/10	Throbbing	1:30 AM	10 mins	Stress	Rest		
10/10/2023	2:30 AM	Room 101	Headache	1/10	Throbbing	2:00 AM	10 mins	Stress	Rest		
10/10/2023	3:00 AM	Room 101	Headache	1/10	Throbbing						

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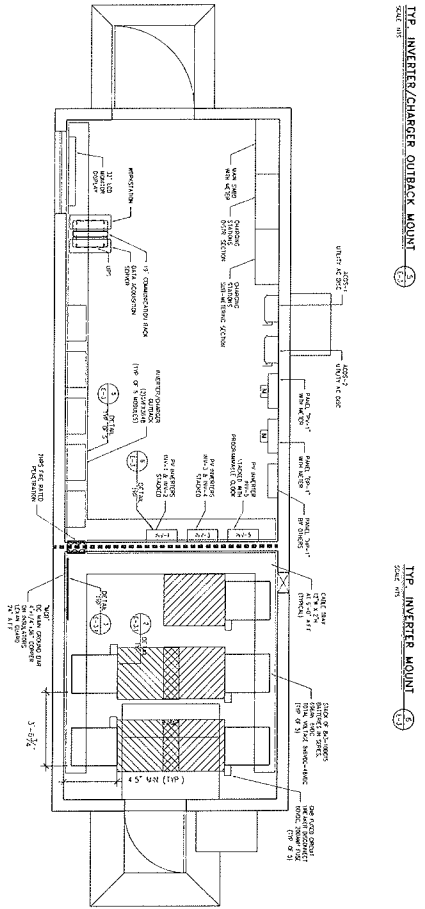
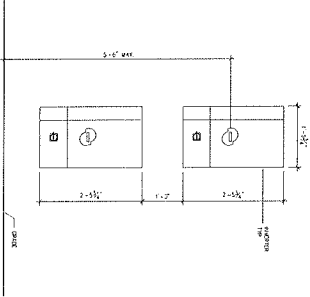
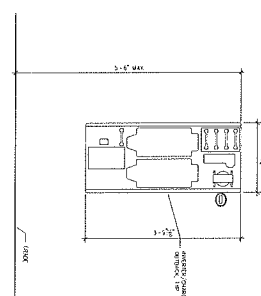
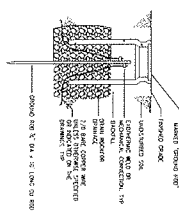
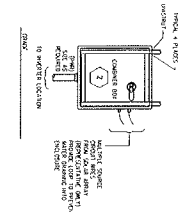
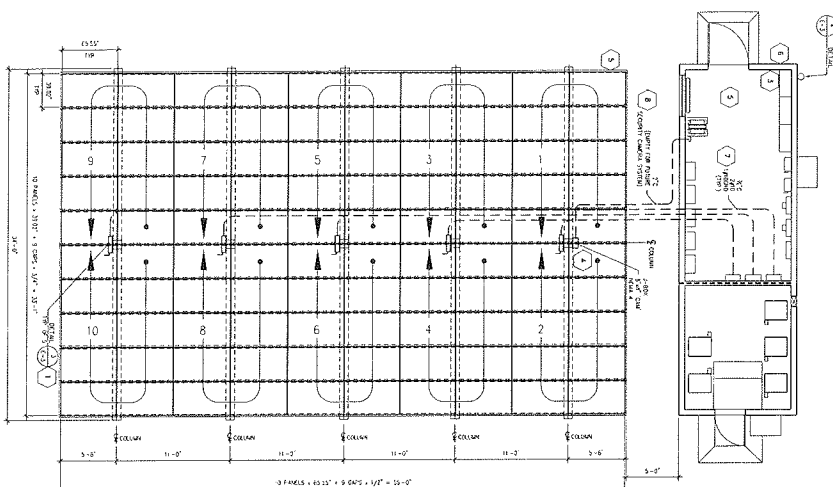
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45	45	45	45	45					

[illegible]

CONTRIBUTOR TO F20 VENTURE MANAGEMENT ASSOCIATE AND NOTARY PUBLIC

[illegible]

CHARGING SITE
WIRE AND CONDUIT
SCHEDULES



- GENERAL NOTES**
1. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70B.
 2. ALL MATERIALS SHALL BE NEW AND OF THE HIGHEST QUALITY AVAILABLE.
 3. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70B.
 4. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70B.
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 7. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70B.
 8. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70B.

- NOTES**
1. THE INVERTER/CHARGER SHALL BE MOUNTED ON THE WALL AS SHOWN IN THE DRAWING.
 2. THE BATTERY BANK SHALL BE MOUNTED ON THE WALL AS SHOWN IN THE DRAWING.
 3. THE ELECTRICAL EQUIPMENT SHALL BE MOUNTED ON THE WALL AS SHOWN IN THE DRAWING.
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 8. THE ELECTRICAL EQUIPMENT SHALL BE MOUNTED ON THE WALL AS SHOWN IN THE DRAWING.

OWNER: THE BAY AREA & CHARGE

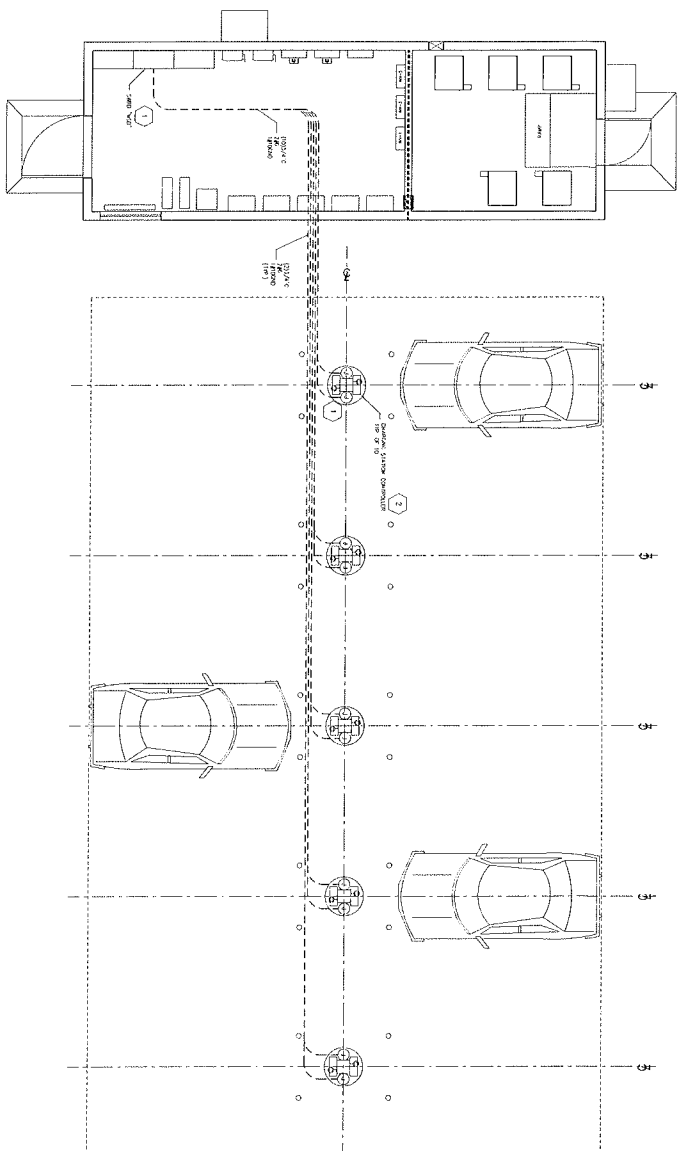
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SOLAR ASSISTED PLUG-IN ELECTRIC VEHICLE CHARGING SITE

ELECTRICAL PLAN

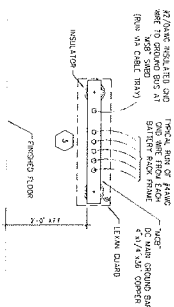
PV MODULES ARRANGEMENT



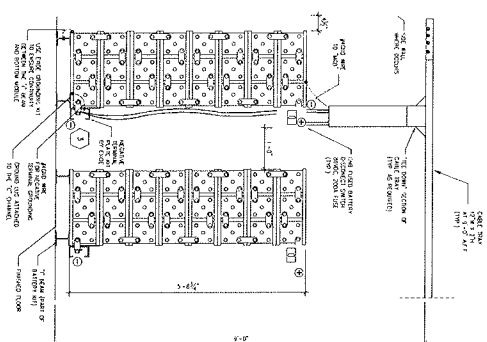
ELECTRICAL PLAN

SCALE 1/4" = 1'-0"

1
E-3



DC MAIN GROUND BAR



BATTERY RACK ELEVATION
SCALE 1"=1'-0"

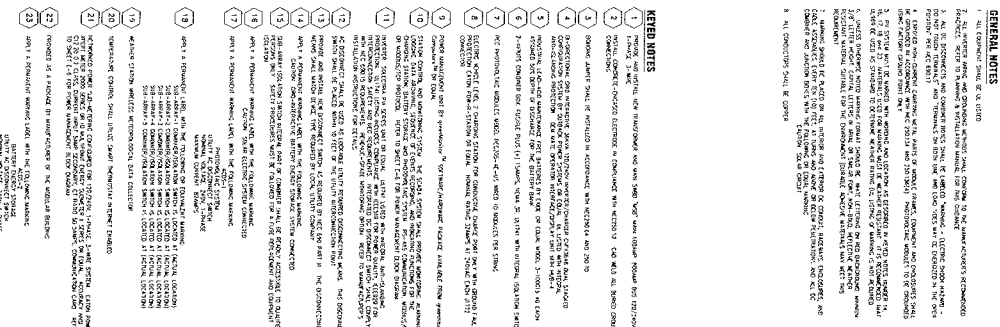
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KEYED NOTES

- [illegible]

[illegible]

GENERAL NOTES



1

NAME	DATE
UNIT	11/25/79
UNIT	11/25/79
UNIT	11/25/79
UNIT	11/25/79

SOLAR-ASSISTED PLUS-IN ELECTRIC VEHICLE CHARGING SITE			
ONE-LINE DIAGRAM			
DATE	DATE	DESIGNED BY	CHECKED BY
AS NOTED	11/25/79	E-2	
		DATE	DATE
		2 OF 8	

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Program:

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Appendix D – ORNL Solar Assisted Charging Demonstration Project

SCIENCE

ORNL marks completion of solar-assisted EV charging stations

With 125 solar-assisted electric vehicle charging stations to be built from Knoxville to Memphis, Tennessee is poised to lead the nation with an electric vehicle demonstration project led by the Department of Energy and industry partners.

At a recent ceremony at ORNL, industry and Lab officials celebrated the completion of 25 solar-assisted electric vehicle charging stations. These join six Electric Power Research Institute stations that were completed in Knoxville earlier this year. The remaining 94 stations are scheduled to be finished by the spring of 2012.

As a demonstration project, these charging stations will provide valuable information about station performance, customer charging preferences, component reliability and the impact on the electric grid. In Tennessee, solar-assisted charging

stations will be installed at Nissan North America in Smyrna and Franklin, Knoxville, the University of Tennessee, Nashville, Memphis and Chattanooga.

Officials expect the visibility of this project to have a promotional effect that encourages consumers to purchase or lease electric vehicles, which will reduce demand for gasoline and reduce greenhouse gas emissions.

"This project is a part of a long-term effort to bring electric vehicle infrastructure to reality," said Lee Slezak, a program manager within DOE's Office of Energy Efficiency and Renewable Energy. Slezak noted that Tennessee is the only state in the Southeast selected to participate in this nationwide endeavor.

Of the \$99.8 million awarded nationally through the American Recovery and Reinvestment Act to Ecotality North America, ORNL received \$6.8 million. Last year this DOE Vehicle Demonstration and Vehicle Infrastructure Evaluation project was awarded an additional \$15 million, and with the partner match the total value of the project is about \$230 million.

In Tennessee, some of the 2535 planned charging stations will be located along Interstates 24, 75 and 40. The units are being supplied by Ecotality North America.

While ORNL is home to experts in transportation, solar, grid, materials for battery storage and power electronics, partners, including the Tennessee Valley Authority and EPRI, bring to the table diverse capabilities that strengthen the team. Other regional partners include the Knoxville Utilities Board, the state of Tennessee, several cities and Nissan, whose Leaf became available in the U.S. late last year.

"Nissan applauds Oak Ridge National Laboratory for its leadership in the development of solar-assisted charging for electric vehicles," said Tracy Woodard, director of government affairs for Nissan North America.

In Tennessee, buyers of electric vehicles are eligible for a \$2,500 rebate from the state and a \$7,500 federal tax credit.

—Ron Walli 🌿



(From left) Katie Southworth, state of Tennessee; Tracy Woodard, Nissan; Thomas Zacharia, ORNL.

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ORNL marks completion of solar-assisted EV charging stations	1
Public tour has attracted thousands thanks to volunteer guides.	2
ORNL rifle sighting system uses sensors to score bull's-eye	3
Club ORNL events.	3
Neutrons provide first sub-nanoscale snapshots of Huntington's disease protein	4
Wellness	5
Treasures from the archives	6
Thom's thoughts	7
Bird watching goes high-tech.	8

Appendix E - Advisory Board Meeting Agendas



Tennessee Region

Stephanie Cox, Stakeholder Services Area Manager - Tennessee

(615) 504-4928

scox@etecevs.com

Advisory Boards EVProject Documents Review and Training Session Agenda

September 17, 2010

1PM – 2PM CST

1PM - 2PM EST

Choose which time works best. 25 ports per session; so, please RSVP.

Conference Call-in #: 212-XXX-XXXX; Participant Pass code: XXX

Project Documents Teleconference Agenda:

Guidelines

Long Range Plan

Implementation Plan

Appendices



Tennessee Region

Stephanie Cox, Stakeholder Services Area Manager - Tennessee
(615) 504-4928
scox@etecevs.com

Advisory Board Weekly Conference Call Agenda

**September 21, 2010
11 AM CST**

Conference Call-in #: 203-XXX-XXXX; Participant Pass code: XXX

Conference Call Agenda:

- Considerations Council Letters of Participation**
 - First Meetings: by November 15th**
 - Advisory Board Updates in 2011:**
 - February**
 - May**
 - August**
 - October**
 - Addendums in 2010-2011**
 - November 2010**
 - March 2011**
 - possibly one more opportunity prior to Dec 2012**
- Hosting Partner Agreement & LOIs: Teamwork!**



Tennessee Region

Stephanie Cox, Stakeholder Services Area Manager - Tennessee
(615) 504-4928
scox@etecevs.com

Knoxville Area Advisory Board Weekly Conference Call Agenda

**September 22, 2010
10AM EST**

EPRI hosts call-in

**Dial In Number: XXX
Pin: XXX**

Conference Call Agenda:

- Contract**
- Hosting Partner Forum**
- Considerations Council Meetings**
- Championing issues**



Tennessee Region

Stephanie Cox, Stakeholder Services Area Manager - Tennessee
(615) 504-4928
scox@etecevs.com

Nashville Area Advisory Board Weekly Conference Call Agenda

**September 22, 2010
10AM CST**

**Dial In Number XXX
Participant Code: XXX**

Conference Call Agenda:

- Contract**
- Hosting Partner Forum**
- Considerations Council Meetings**
- Championing issues**



Tennessee Region

Stephanie Cox, Stakeholder Services Area Manager - Tennessee
(615) 504-4928
scox@etecevs.com

Chattanooga Area Advisory Board Bi-Monthly Conference Call Agenda

**October 5, 2010
2PM EST**

**Dial In Number: XXX
Conference ID: XXX
PIN: Not Required
Password: XXX**

Topics and Agenda:

Participation Process:

- **Letter of Intent**
- **Site Assessment**
- **Agreement / Proposal**
- **Construction Contracts**
- **Installation**
- **Orientation**

Siting Update

Hosting Partner Forums:

- **Invitees**
- **Goal**
- **Presenters**
- **Target Dates**

Next meeting: Additional Members



Tennessee Region

Stephanie Cox, Stakeholder Services Area Manager - Tennessee
(615) 504-4928
scox@etecevs.com

Advisory Board Weekly Conference Call Agenda

**October 5, 2010
11 AM CST**

Conference Call-in #: 203-XXX-XXXX; Participant Pass code: XXX

Topics and Agenda:

Participation Process:

- Letter of Intent
- Site Assessment
- Agreement / Proposal
- Construction Contracts
- Installation
- Orientation

Siting Update

Hosting Partner Forums:

- Invitees
- Goal
- Presenters
- Target Dates

Next meeting: Additional Members

Notes: TVPPA is creating an EV Task Force. A rep from this task force.

Nissan announced that there are 422 reservationists in the State of TN. They think that only 300 were in the EV Project territory. They have a contractual issue with AV and that is the sticking point on adding zip codes to the EVProject territory. They will provide marketing material for trade shows that we do.



Tennessee Region

Stephanie Cox, Stakeholder Services Area Manager - Tennessee
(615) 504-4928
scox@etecevs.com

Nashville Area Advisory Board Weekly Conference Call Agenda

**October 6, 2010
10AM CST**

**Dial In Number XXX
Participant Code: XXX**

Topics and Agenda:

Participation Process:

- **Letter of Intent**
- **Site Assessment**
- **Agreement / Proposal**
- **Construction Contracts**
- **Installation**
- **Orientation**

Siting Update

Hosting Partner Forums:

- **Invitees**
- **Goal**
- **Presenters**
- **Target Dates**

Next meeting: Additional Members



Tennessee Region

Stephanie Cox, Stakeholder Services Area Manager - Tennessee
(615) 504-4928
scox@etecevs.com

Advisory Board Weekly Conference Call Agenda

**October 19, 2010
11 AM CST**

WEBINAR

Topics and Agenda:

Recent EVProject Announcements

- **DC Fast Charger reveal**
- **BP**

RECAP:

Participation Process:

- **Letter of Intent**
- **Site Assessment**
- **Agreement / Proposal**
- **Construction Contracts**
- **Installation**
- **Orientation**

Hosting Partner Forums:

- **Invitees**
- **Goal**
- **Presenters**
- **Target Dates**



Bi-weekly Update

December 14, 2010

State Advisory Boards





Agenda

- 2011 Update Schedule
- Results from Hosting Partner Forums
- Current Siting Focus
- Current Issues
- Upcoming Events
- Hosting Agreement
- Site Assessments



Bi-weekly Update

December 15, 2010

Area Advisory Boards





Agenda

- 2011 Update Schedule
- Results from Hosting Partner Forums
- Current Siting Focus
- Current Issues
- Upcoming Events
- Hosting Agreement
- Site Assessments



Tennessee Region

Stephanie Cox, Stakeholder Services Area Manager - Tennessee

(615) 504-4928

scox@etecevs.com

State Advisory Board Monthly Conference Call Agenda

January 11, 2011

11 AM CST

Conference Call-in #: XXX

Participant Code: XXX

- Meeting Planning for a physical meeting of the group**
- Memphis – State Commitment, Zips and PR**
- 2011 Milestones and Project Schedule**
 - PR Event – Solar Assisted Charging Station Opening Jan. 25th**
 - PR Event for EVP resident: Mid-February**
 - Memphis HPF Tentative date: February 22nd (Peabody Hotel)**
 - Hosting Partner Forum Knoxville: February 24th (Chamber)**
 - Nissan Electric Drive Tour Knoxville Feb 25th-27th**
 - Workplace Charging Impact Study Initial Comm. February 28th**
 - Garage-less Needs Analysis Initial Comm. April 4th**

2011 Update Schedule –

Second Tuesday of each month

11AM CST – Topics for Focus

January 11th – 2011 Milestones and Project Schedule

February 15th – Round 2 Hosting Partner Forum Prep and Workplace Charging

March 15th – DC Fast Charger Deployment

April 12th – Percent Completes for EVProject & Garage-less Needs Analysis

May 10th – EVProject Best Practices - Planning - Report

June 14th – LEAF and EV Market Penetration in TN and Nationally

July 12th – Round 3 Hosting Partner Forum Prep

August 9th – Diversity of Choice: Goals vs Actual

September 13th – EVProject Data Collection

October 11th – National Issues

November 8th – Garage-less needs analysis Report

December 13th – 2011 Goals vs Actual

January 12th AGENDA 10AM CST

-2011 Milestones and Project Schedule

- PR Event – Solar Assisted Charging Station Opening Jan. 25th
- PR Event for EVP resident: Mid-February
- Memphis HPF Tentative date: February 22nd (Peabody Hotel)
- Hosting Partner Forum Knoxville: February 24th (Chamber?)
- Nissan Electric Drive Tour Knoxville Feb 25th-27th
- Workplace Charging Impact Study Initial Comm.: February 28th
- HPF for Chattanooga Tentative date: March 22nd (Doubletree Hotel)
- HPF for Nashville Tentative Date: March 24th (TBD)
- Garage-less Needs Analysis Initial Comm.: April 4th
- Completion of WCIS: April 11th
- Completion of GNA: June 13th
- Installs Complete: Sept. 2011
- Hosting Partner Forums repeat November (for actual host sites)

2011 Schedule and Topics:

January 12th – 2011 Milestones and Project Schedule

February 9th – Round 2 Hosting Partner Forum Prep and Workplace Charging

March 9th – DC Fast Charger Deployment

April 13th – Percent Completes for EVProject & Garage-less Needs Analysis

May 11th – EVProject Best Practices - Planning - Report

June 15th – LEAF and EV Market Penetration in TN and Nationally

July 13th – Round 3 Hosting Partner Forum Prep

August 10th – Diversity of Choice: Goals vs Actual

September 14th – EVProject Data Collection

October 12th – National Issues

November 9th – Garage-less needs analysis Report

December 14th – 2011 Goals vs Actual

Thank you all for your continued attention to and support of the EVProject!

Stephanie Cox
Stakeholder Services Area Manager - Tennessee



For additional information, please visit: www.theevproject.com

When: Monday, February 07, 2011 12:00 PM-2:00 PM (GMT-06:00) Central Time (US & Canada). Where: EPB 7th Floor

Note: The GMT offset above does not reflect daylight saving time adjustments.

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The purpose of the February 7th meeting will be to:

- reviewing siting efforts in the Chattanooga Area
- plan for the next hosting partner forum – March 22nd @ Doubletree Hotel 9AM-12
- discuss Chattanooga's desire (or not) to pursue permitting and inspection training with TVA

The next EVProject Update teleconference was scheduled on the 9th of February; but, this physical meeting on the 7th will take the place of the February Monthly EVP update!

Looking ahead....The March teleconference meeting invite and agenda will be sent out March 1st for the March EVProject Update teleconference which will be held the 8th of March at 2PM EST. The main topic for the March 8th teleconference will be DC Fast Charger Deployment.

Chattanooga Area Advisory Board 2011 Teleconference Call Dates & Topics

March 8th – DC Fast Charger Deployment

April 12th – Percent Completes for EVProject & Garage-less Needs Analysis

May 10th – EVProject Best Practices - Planning - Report

June 14th – LEAF and EV Market Penetration in TN and Nationally

July 12th – Round 3 Hosting Partner Forum Prep

August 9th – Diversity of Choice: Goals vs. Actual

September 13th – EVProject Data Collection

October 11th – National Issues

November 8th – Garage-less needs analysis Report

December 13th – 2011 Goals vs. Actual

All Calls: Conference Call-in #: 212-XXX-XXXX; Participant Pass code: XXX

Subject: Knoxville Area Advisory Board EVProject Update Teleconference

When: Wednesday, February 09, 2011 9:00 AM-10:00 AM (GMT-06:00) Central Time (US & Canada). Where: Teleconference

Note: The GMT offset above does not reflect daylight saving time adjustments.

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Knoxville Area Advisory Board February EVProject Update Teleconference

**10
AM
EST
Ag
end
a:**

- Round 2 Hosting Partner Forum Prep
 - Speakers
 - Invites
 - Goal
- Knoxville Area Siting Progress Update

**All Calls: Conference Call-in #: 212-XXX-XXXX; Participant Pass
code: XXX.**

2011 Schedule and

Topics: February 9th – Round 2

Hosting Partner Forum Prep March 9th –
DC Fast Charger Deployment

April 13th – Percent Completes for EVProject & Garage-less Needs Analysis

May 11th – EVProject Best Practices - Planning - Report

June 15th – LEAF and EV Market Penetration in TN and Nationally

July 13th – Round 3 Hosting Partner Forum Prep

August 10th – Diversity of Choice: Goals vs. Actual

September 14th – EVProject Data Collection October 12th – National Issues

November 9th – Garage-less needs analysis Report

December 14th – 2011 Goals vs. Actual

Subject: Nashville Area Advisory Board February Monthly EVProject Update

When: Wednesday, February 09, 2011 10:00 AM-11:00 AM (GMT-06:00) Central Time (US & Canada). Where: Teleconference: Conference Call-in #: 212-200-5010 Participant Code: 65417.

Note: The GMT offset above does not reflect daylight saving time adjustments.

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Nashville Area Advisory Board February EVProject Update Teleconference 10AM CST

Agenda:

- Round 2 Hosting Partner Forum Prep
 - Speakers
 - Invites
 - Goal
- Nashville Area Siting Progress Update

All Calls: Conference Call-in #: 212-XXX-XXXX; Participant Pass code: XXX.

2011 Schedule and Topics:

February 9th – Round 2 Hosting Partner Forum Prep
March 9th – DC Fast Charger Deployment
April 13th – Percent Completes for EVProject & Garage-less Needs Analysis
May 11th – EVProject Best Practices - Planning - Report
June 15th – LEAF and EV Market Penetration in TN and Nationally
July 13th – Round 3 Hosting Partner Forum Prep
August 10th – Diversity of Choice: Goals vs. Actual
September 14th – EVProject Data Collection
October 12th – National Issues
November 9th – Garage-less needs analysis Report
December 14th – 2011 Goals vs. Actual



Tennessee Region

Stephanie Cox, Stakeholder Services Area Manager - Tennessee

(615) 504-4928

scox@etecevs.com

State Advisory Board Monthly Conference Call – February Agenda

February 15th

11 AM CST

Conference Call-in #: 212-XXX-XXXX; Participant Pass code:
XXX.

- Round 2 Hosting Partner Forum Prep
 - Speakers
 - Invites
 - Goal
- Workplace Charging Impact Study
 - timeframe
 - scope
 - parties involved

EVProject

MASTER CALL SCHEDULE:

State: 11AM CST

Chattanooga: Second Tuesday at 1PM CST

Knoxville: Second Wednesday at 9 AM CST

Nashville: Second Wednesday at 10 AM CST

Memphis: TBD

Subject:

HPF Invitation

When: Tuesday, February 15, 2011 11:00 AM-12:00 PM (GMT-06:00) Central Time (US & Canada). Where: Teleconference

Note: The GMT offset above does not reflect daylight saving time adjustments.

State Advisory Board Monthly Conference Call–**February Agenda****February 15th****11 AM CST**

Conference Call-in #: 212-XXX-XXXX; Participant Pass code: XXX.

Budget Increase

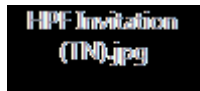
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Contract Rewrites

-

MCP update

-

**Knox idea for HPF**

-Round 2 Hosting Partner Forum Prep

-Speakers

-Invites

-Goal

-Workplace Charging Impact Study – do we want to work with other state?

-timeframe

-scope

-parties involved

EVProject

MASTER CALL SCHEDULE:

State: 11AM CST

Chattanooga: Second Tuesday at 1PM CST

Knoxville: Second Wednesday at 9 AM CST

Nashville: Second Wednesday at 10 AM CST

Memphis: TBD

All Calls: Conference Call-in #: 212-200-5010 Participant Code: 65417

Subject: Chattanooga Area EVProject Advisory Board Monthly Update Teleconference

When: Tuesday, March 08, 2011 1:00 PM-1:30 PM (GMT-06:00) Central Time (US & Canada).

Where: Conference Call-in #: 212-200-5010 Participant Code: 65417

Note: The GMT offset above does not reflect daylight saving time adjustments.

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Main Agenda item: DC Fast Charger Deployment

Other: Micro-Climate Plan: bringing the pieces together

Chattanooga Area Advisory Board 2011 Teleconference Call Dates & Topics

**All Calls: Conference Call-in #: 212-XXX-XXXX; Participant Pass
code: XXX.**

March 8th – DC Fast Charger Deployment

April 12th – Percent Completes for EVProject & Garage-less Needs Analysis

May 10th – EVProject Best Practices - Planning - Report

June 14th – LEAF and EV Market Penetration in TN and Nationally

July 12th – Round 3 Hosting Partner Forum Prep

August 9th – Diversity of Choice: Goals vs. Actual

September 13th – EVProject Data Collection

October 11th – National Issues

November 8th – Garage-less needs analysis Report

December 13th – 2011 Goals vs. Actual

Chattanooga EVProject Advisory Board Monthly

Note: The GMT offset above does not reflect daylight saving time adjustments.

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Chattanooga Area Advisory Board Monthly Conference Call – April Agenda
March 8th
1 PM CST / 2PM EST

- ADA and EV Charging**
- Current Siting Efforts: Mapping**
- Revised Project Schedule**
- Utility Reporting**
- Revised Host Agreement**
- ARRA: EVSE siting restrictions & installation guidelines**
- Micro-Climate Plan: bringing the pieces together**

Chattanooga Area Advisory Board 2011 Teleconference Call Dates & Topics

All Calls: Conference Call-in #: 212-XXX-XXXX; Participant Pass code: XXX.

May 10th – EVProject Best Practices - Planning - Report
June 14th – LEAF and EV Market Penetration in TN and Nationally
July 12th – Round 3 Hosting Partner Forum Prep
August 9th – Diversity of Choice: Goals vs. Actual
September 13th – EVProject Data Collection
October 11th – National Issues
November 8th – Open
December 13th – 2011 Goals vs. Actual

Subject:
11AM 3-8-11

State Advisory Board Monthly Update Teleconference

When: Tuesday, March 08, 2011 11:00 AM-11:30 AM (GMT-06:00) Central Time (US & Canada). Where: Conference Call-in #: 212-200-5010 Participant Code: 65417

Note: The GMT offset above does not reflect daylight saving time adjustments.

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**State Advisory Board Monthly Conference Call – March Agenda
March 8th
11 AM CST**

Main Agenda item:

DC Fast Charger Deployment

Other: Micro-Climate Plan: bringing the pieces together

All Calls: Conference Call-in #: 212-XXX-XXXX;

Participant Pass code: XXX.

2011 Schedule and Topics:

March 9th – DC Fast Charger Deployment

April 13th – Percent Completes for EVProject & Garage-less Needs Analysis

May 11th – EVProject Best Practices - Planning - Report

June 15th – LEAF and EV Market Penetration in TN and Nationally

July 13th – Round 3 Hosting Partner Forum Prep

August 10th – Diversity of Choice: Goals vs. Actual

September 14th – EVProject Data Collection

October 12th – National Issues

November 9th – Garage-less needs analysis Report

December 14th – 2011 Goals vs. Actual

Subject:

RE: Chattanooga Area EVProject Advisory Board Monthly Update Teleconference

Attached is EVProject Tennessee Implementation Plan's city specific introduction guide discussed today.



Stephanie Cox
Stakeholder Services Area Manager - Tennessee



For additional information, please visit: www.theevproject.com

Chattanooga Area Advisory Board Monthly Conference Call – March Agenda

March 8th

1 PM CST / 2PM EST

Main Agenda item: DC Fast Charger Deployment

Other: Micro-Climate Plan: bringing the pieces together

Chattanooga Area Advisory Board 2011 Teleconference Call Dates & Topics

**All Calls: Conference Call-in #: 212-XXX-XXXX; Participant Pass code:
XXX.**

March 8th – DC Fast Charger Deployment

April 12th – Percent Completes for EVProject & Garage-less Needs Analysis

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July 12th – Round 3 Hosting Partner Forum Prep

August 9th – Diversity of Choice: Goals vs. Actual

September 13th – EVProject Data Collection

October 11th – National Issues

November 8th – Garage-less needs analysis Report

December 13th – 2011 Goals vs. Actual

Tennessee EVProject Implementation Plan: City Specific Introduction

Expected length is 3 pages

-logo / mantra / motto

-How do EVs integrate with the area's overall support of clean fuels, clean air and existing green transportation initiatives?

-Will EV infrastructure planning change current transportation planning and patterns?

-How will permitting and inspection be handled in the region?

-How will EV's impact to local businesses be addressed/handled/supported?

-How might EV infrastructure impact/support tourism?

-Will the area support EV adoption in the region? Why?

-Will the city consider EV for fleet? Why?

Tennessee EVProject Implementation Action Plan

March 23 rd	First Draft due to ECOtality
March 30 th	State Advisory Board - complete draft review session
April 6 th	Revision suggestions due from Complete Document Review
April 15 th	Revisions (Round 2) due to ECOtality
April 22 nd	Final Group Review – Webinar with real time editing.
April 30	Final TN EVProject Implementation Plan Due

EVProject Knoxville Area Advisory

When: Wednesday, March 09, 2011 9:00 AM-9:30 AM (GMT-06:00) Central Time (US & Canada). Where: Conference Call-in #: 212-200-5010 Participant Code: 65417

Note: The GMT offset above does not reflect daylight saving time adjustments.

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Knoxville Area Advisory Board Update Monthly Conference Call – March Agenda
March 9th
9 AM CST / 10AM EST

Main Agenda item: **DC Fast Charger Deployment**

Other: Micro-Climate Plan: bringing the pieces together

All Calls: Conference Call-in #: 212-XXX-XXXX; Participant Pass code: XXX.

Complete 2011 Schedule and Topics:

March 9th – DC Fast Charger Deployment
April 13th – Percent Completes for EVProject & Garage-less Needs Analysis
May 11th – EVProject Best Practices - Planning - Report
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Tennessee
EvProject Imple...

Subject: EVProject Nashville Area Advisory Board
Update

When: Wednesday, March 09, 2011 10:00 AM-10:30 AM (GMT-06:00) Central Time (US & Canada). Where: Conference Call-in #: 212-200-5010 Participant Code: 65417

Note: The GMT offset above does not reflect daylight saving time adjustments.

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Nashville Area Advisory Board Update Monthly Conference Call – March Agenda
March 9th
10 AM CST

Conference Call-in #: 212-200-5010 Participant Code: 65417

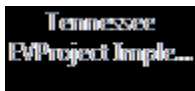
Main Agenda item: **DC Fast Charger**
Deployment

Other: Micro-Climate Plan: bringing the pieces together

All Calls: Conference Call-in #: 212-200-5010 Participant Code: 65417.

Complete 2011 Schedule and Topics:

March 9th – DC Fast Charger Deployment
April 13th – Percent Completes for EVProject & Garage-less Needs Analysis
May 11th – EVProject Best Practices - Planning - Report
June 15th – LEAF and EV Market Penetration in TN and Nationally
July 13th – Round 3 Hosting Partner Forum Prep
August 10th – Diversity of Choice: Goals vs. Actual
September 14th – EVProject Data Collection
October 12th – National IssuesNovember 9th – Garage-less needs analysis Report
December 14th – 2011 Goals vs. Actual



Subject:

Teleconference

EVProject State Advisory Board Monthly Update -

When: Tuesday, April 12, 2011 11:00 AM-12:00 PM (GMT-06:00) Central Time (US & Canada). Where: Conference Call-in #: 212-200-5010 Participant Code: 65417

Note: The GMT offset above does not reflect daylight saving time adjustments.

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**State Advisory Board Monthly Conference Call – April Agenda
April 12, 2011
11 AM CST**

Main Agenda items:

ADA and EV Charging

Current Siting Efforts: Mapping

Revised Project Schedule

Utility Reporting

Revised Host Agreement

ARRA: EVSE siting restrictions & installation guidelines

Micro-Climate Plan: bringing the pieces together2011

Teleconference Call Dates & Topics

All Calls: Conference Call-in #: 212-200-5010 Participant Code: 65417.

May 10th – EVProject Best Practices - Planning - Report

June 14th – LEAF and EV Market Penetration in TN and Nationally

July 12th – Round 3 Hosting Partner Forum Prep

August 9th – Diversity of Choice: Goals vs. Actual

September 13th – EVProject Data Collection

October 11th – National Issues

November 8th – Open

December 13th – 2011 Goals vs. Actual

Knoxville Area Advisory Board Update
Monthly Conference Call – April
Agenda
April 13th
9 AM CST / 10AM EST
Conference Call-in #:

Main Agenda items:

ADA and EV Charging

Current Siting Efforts: Mapping

Revised Project Schedule

Utility Reporting

Revised Host Agreement

ARRA: EVSE siting restrictions & installation guidelines

Micro-Climate Plan: bringing the pieces together

Complete 2011 Schedule and Topics:

May 11th – EVProject Best Practices - Planning - Report

June 15th – LEAF and EV Market Penetration in TN and Nationally (note that this date is NOT the second Wednesday of the month; but the third Wednesday)

July 13th – Round 3 Hosting Partner Forum Prep

August 10th – Diversity of Choice: Goals vs. Actual

September 14th – EVProject Data Collection

October 12th – National Issues

November 9th – Open

December 14th – 2011 Goals vs. Actual

Conference Call-in #: 212-XXX-XXXX; Participant Pass code: XXX.

Nashville Area Advisory Board Update
Monthly Conference Call – April Agenda
April 13th
10 AM CST

Main Agenda items:

Nashville MPO Mapping Methodology

ADA and EV Charging

Current Siting Efforts: Mapping

Revised Project Schedule

Utility Reporting

Revised Host Agreement

ARRA: EVSE siting restrictions & installation guidelines

Micro-Climate Plan: bringing the pieces together

Complete 2011 Schedule and Topics:

May 11th – EVProject Best Practices - Planning - Report

June 15th – LEAF and EV Market Penetration in TN and Nationally (note that this date is NOT the second Wednesday of the month; but the third Wednesday)

July 13th – Round 3 Hosting Partner Forum Prep

August 10th – Diversity of Choice: Goals vs. Actual

September 14th – EVProject Data Collection

October 12th – National Issues

November 9th – Garage-less needs analysis Report

December 14th – 2011 Goals vs. Actual

Conference Call-in #: 212-XXX-XXXX; Participant Pass code: XXX.

Subject:

REPEAT: Nashville Area Advisory Board Meeting

Because the webinar and teleconference option did not function during last week's meeting, we are repeating the session this coming Wednesday (and Thursday, if needed). Please do RSVP (if you need to have a Thursday time, please suggest a time from 1-4PM). We had technical difficulties last week, for which I apologize. There are important changes to the implementation of the EVProject and critical resources being provided on which ECOtality wants to ensure that all area stakeholders have had input.

REPEATED: Nashville Area Advisory Board Update

Monthly Conference Call – April

Agenda presented on April 13th

Date of this REPEATED SESSION: APRIL 20

10 AM CST

Main Agenda items:

Nashville MPO Mapping Methodology

ADA and EV Charging

Current Siting Efforts: Mapping

Revised Project Schedule

Utility Reporting

Revised Host Agreement

ARRA: EVSE siting restrictions & installation guidelines

Micro-Climate Plan: bringing the pieces together

Complete 2011 Schedule and Topics:

May 11th – EVProject Best Practices - Planning - Report

June 15th – LEAF and EV Market Penetration in TN and Nationally (note that this date is NOT the second Wednesday of the month; but the third Wednesday)

July 13th – Round 3 Hosting Partner Forum Prep

August 10th – Diversity of Choice: Goals vs. Actual

September 14th – EVProject Data Collection

October 12th – National Issues

November 9th – Garage-less needs analysis Report

December 14th – 2011 Goals vs. Actual

Conference Call-in #: 212-XXX-XXXX; Participant Pass code: XXX.

**State Advisory Board Monthly Update – May Agenda
May 10, 2011**

Main Agenda items:

Nissan Hand Raiser and Registrant Update

Micro-Climate Plan Review

ADA

Siting Efforts

2011 Teleconference Call Dates & Topics

**All Calls: Conference Call-in #: 212-XXX-XXXX; Participant
Pass code: XXX**

May 10th – EVProject Best Practices - Planning - Report

June 14th – LEAF and EV Market Penetration in TN and Nationally

July 12th – Round 3 Hosting Partner Forum Prep

August 9th – Diversity of Choice: Goals vs. Actual

September 13th – EVProject Data Collection

October 11th – National Issues

November 8th – Open

December 13th – 2011 Goals vs. Actual

Knoxville & Chattanooga Area Advisory

Boards

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Monthly Conference Call –

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9 AM CST /

10AM EST

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Main Agenda items:

Nissan Hand Raiser and Registrant Update

Micro-Climate Plan Review

ADA

Siting Efforts

Complete 2011 Schedule and Topics:

May 11th – LEAF and EV Market Penetration in TN and Nationally

June 15th – EVProject Best Practices - Planning - Report (note that this date is NOT the second Wednesday of the month; but the third Wednesday)

July 13th – Round 3 Hosting Partner Forum Prep

August 10th – Diversity of Choice: Goals vs. Actual

September 14th – EVProject Data Collection

October 12th – National Issues

November 9th – Open

December 14th – 2011 Goals vs. Actual

Conference Call-in #: 212-XXX-XXXX; Participant Pass code: XXX.



DRAFT EVSE
Summary Report...



Draft EVProject
Nissan Fact Sh...



May 10-11
Advisory Board ...

Knoxville & Chattanooga Area Advisory

Boards

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Monthly Conference Call –

May

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May

11th

9 AM CST /

10AM EST

Conference Call-in #:

Webinar Registration:

Main Agenda items:

Nissan Hand Raiser and Registrant Update

Micro-Climate Plan Review

ADA

Siting Efforts

Complete 2011 Schedule and Topics:

May 11th – LEAF and EV Market Penetration in TN and Nationally

June 15th – EVProject Best Practices - Planning - Report (note that this date is NOT the second Wednesday of the month; but the third Wednesday)

July 13th – Round 3 Hosting Partner Forum Prep

August 10th – Diversity of Choice: Goals vs. Actual

September 14th – EVProject Data Collection

October 12th – National Issues

November 9th – Open

December 14th – 2011 Goals vs. Actual

Conference Call-in #: 212-XXX-XXXX; Participant Pass code: XXX.



**DRAFT EVSE
Summary Report...**



**Draft EVProject
Nissan Fact Sh...**



**May 10-11
Advisory Board ...**

Nashville Area Advisory Board
Update
Monthly Conference Call – May
Agenda
May 11th
10 AM CST / 11AM EST
Conference Call-in #:
Webinar Registration:

Main Agenda items:

Nissan Hand Raiser and Registrant Update

Micro-Climate Plan Review

ADA

Siting Efforts

Complete 2011 Schedule and Topics:

May 11th – LEAF and EV Market Penetration in TN and Nationally

June 15th – EVProject Best Practices - Planning - Report (note that this date is NOT the second Wednesday of the month; but the third Wednesday)

July 13th – Round 3 Hosting Partner Forum Prep

August 10th – Diversity of Choice: Goals vs. Actual

September 14th – EVProject Data Collection

October 12th – National Issues

November 9th – Open

December 14th – 2011 Goals vs. Actual

Conference Call-in #: 212-XXX-XXXX; Participant Pass code: XXX.



DRAFT EVSE
Summary Report...



Draft EVProject
Nissan Fact Sh...



May 10-11
Advisory Board ...



Advisory Board Monthly Update

June 14th – June 15th, 2011

Conference Call-in #: xxx

State Advisory Board - Tuesday June 14th 11AM CST

Register Now for Webinar at:

East TN Area Advisory Board (Knoxville and Chattanooga) - June 15th 9AM CST

Register Now at:

Middle TN Advisory Board (Nashville) - June 15th 10AM CST

Register Now at:

Main Agenda items:

Micro-Climate Plan:

Tennessee Implementation Process Document Review

MPO Interactive Map Demonstration

Siting Efforts

2011 Teleconference Call Dates & Topics

All Calls: Conference Call-in #: 212-XXX-XXXX;

Participant Pass code: XXX.

July 12-13th – LEAF and EV Market Penetration in TN and Nationally

August 9-10th – Round 3 Hosting Partner Forum Prep

September 13-14th – Diversity of Choice: Goals vs. Actual

October 11-12th – National Issues and EVProject Data Collection

November 8-9th – Open

December 13-14th – 2011 Goals vs. Actual

State Advisory Board Monthly Update

June 14th, 2011

11AM CST

Conference Call-in #: XXX

State Advisory Board - Tuesday June 14th 11AM CST

Register Now for Webinar at:

Main Agenda items:

Micro-Climate Plan:

Tennessee Implementation Process Document Review

MPO Interactive Map Demonstration

Siting Efforts

2011 Teleconference Call Dates & Topics

All Calls: Conference Call-in #: 212-XXX-XXXX;

Participant Pass code: XXX.

July 12 – LEAF and EV Market Penetration in TN and Nationally

August 9 – Round 3 Hosting Partner Forum Prep September

13 – Diversity of Choice: Goals vs. Actual October 11 –

National Issues and EVProject Data Collection November 8

– Open

December 13 – 2011 Goals vs. Actual



**East Tennessee Advisory Board Monthly
Update**

June 15th, 2011 9AM
CST

Conference Call-in #: XXX

**East TN Area Advisory Board (Knoxville and Chattanooga) - June 15th 9AM
CST**

Main Agenda items:

Micro-Climate Plan:

Tennessee Implementation Process Document Review

MPO Interactive Map Demonstration

Siting Efforts

2011 Teleconference Call Dates & Topics

All Calls: Conference Call-in #: 212-XXX-XXXX;

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July 13th – LEAF and EV Market Penetration in TN and Nationally

August 10th – Round 3 Hosting Partner Forum Prep

September 14th – Diversity of Choice: Goals vs. Actual

October 12th – National Issues and EVProject Data Collection

November 9th – Open

December 14th – 2011 Goals vs. Actual



**Advisory Board Monthly
Update**

June 15th,
2011

Conference Call-in #: XXX

Middle TN Advisory Board (Nashville) - June 15th 10AM

CST

Register Now
at:

Main Agenda items:

Micro-Climate Plan:

Tennessee Implementation Process Document Review

MPO Interactive Map Demonstration

Siting Efforts

2011 Teleconference Call Dates & Topics

**All Calls: Conference Call-in #: 212-200-5010 Participant
Code: 65417.**

July 13th – LEAF and EV Market Penetration in TN and Nationally

August 10th – Round 3 Hosting Partner Forum Prep

September 14th – Diversity of Choice: Goals vs. Actual

October 12th – National Issues and EVProject Data Collection

November 9th – Open

December 14th – 2011 Goals vs. Actual