Introduction

This document presents a comprehensive Job Task Analysis (JTA) for PV Technical Sales Professionals. The JTA was developed by a group of subject matter experts in the field of PV Technical Sales, and it breaks down the knowledge and skills necessary to adequately perform the tasks for this position. It is important to note that the tasks outlined in this JTA apply to a range of PV sales personnel including but not limited to: PV sales managers, PV account managers, PV business development associates, PV marketing directors, PV sales consultants, and PV marketing consultants.

This JTA reflects the changes inherent in the growth and maturity of the role of technical salespeople in the solar industry over the last five years. Although there have been many changes to financing options, storage options, and rapid growth in the commercial, industrial, and utility-scale deployment of PV technology, the basic knowledge areas contained in the JTA remain fairly constant.

The tasks described in this JTA were developed based on conventional technical sales practices and techniques used in the industry today; they do not seek to limit or restrict innovative sales tools, customer relations management systems, or other sales practices. As with any developing market, it is fully expected that the skills required of the practitioner will develop and change over time as new materials, techniques, codes, and standards evolve.

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### Job Description

A PV Technical Salesperson is a solar professional with demonstrated expertise in qualifying prospects, site analysis, conceptual system design, performance analysis, and financial incentives of PV systems. A PV Technical Salesperson can collect technical requirements, analyze customer needs and determine energy usage to advise and provide customers with the most appropriate solution for their situation.
Domain 1: Qualifying Prospects

**Task 1:** Analyze an electric bill by using historical (or anticipated) usage and rate structure to calculate system size and savings estimates.

**Knowledge of:**
- a. Utility bills
- b. Seasonal patterns
- c. Various fuel sources
- d. Utility rates

**Task 2:** Perform remote site assessment by using available industry tools to begin site analysis preparation.

**Knowledge of:**
- a. Building orientation
- b. Roof tilt or angle
- c. Usable area
- d. Shading and obstructions
- e. Type and condition of roof
- f. Type of property (e.g., residential, condominium, commercial)
- g. Impact of site conditions on feasibility of a solar system
- h. Limitations of remote tools
- i. Reasons why solar might not be appropriate

**Task 3:** Assess goals and motivations of prospects to identify their needs.

**Knowledge of:**
- a. Prospect motivations for going solar
- b. Future energy usage
- c. Desired time frame
- d. Financing mechanisms
- e. Electric usage pattern
- f. Pros and cons of battery backup vs. a generator
- g. Basic sales skills
- h. Financial tools

**Task 4:** Identify potential jurisdictional issues that might affect project viability, progress, or execution.

**Knowledge of:**
- a. Zoning and potential issues
- b. Fire code requirements (e.g., NFP1, IFC, IRC, IRC)
- c. Local AHJ and utility code requirements
- d. Homeowner association requirements (if applicable)
- e. Utility requirements (e.g. interconnection)
Task 5: Provide prospects with preliminary estimates of project costs based on their goals, motivations, resources, site conditions, and market conditions.

Knowledge of:

- Array size based on kWh consumption and available array area
- Price of array size based on average dollar per watt
- Roof type, slope, and height
- Potential price adders
- Impact of building logistics on installation costs (e.g., height)
- Impact of long runs of conduit and wiring on costs
- Available incentives
- Price range development
- Savings estimates
- Preliminary economic analysis
- Customer budget limitations
- Permitting requirements

Task 6: Manage customer expectations by providing realistic project information and addressing misconceptions.

Knowledge of:

- Differences between battery and non-battery systems
- PV limitations (generates electricity but does not offset gas loads or be a cost efficient way to heat water, space, or pools)
- Seasonal variations in output
- Required level of routine maintenance
- Manufacturer and installation warranties
- Life expectancy of equipment
- Aesthetics
- Emerging vs. existing technologies
- Expected output vs. system capacity
- Instantaneous power vs. annual energy production
- Insurance issues, workers’ compensation, and liability
- Potential impact on a roof warranty
- Performance validation methods
- Basic solar energy systems
- General financial understanding and return on investment (ROI)
- Product limitations (e.g., on-grid vs. off-grid, installation locations)
Domain 2: Site Analysis

**Task 1:** Assess safety issues and project hazards by visual inspection and site walkthrough to anticipate installation and design challenges.

**Knowledge of:**
- Building logistics
- Environmental factors
- Weather conditions
- Structural integrity
- Roof material
- OSHA considerations
- Electrical hazards
- Unpermitted work
- Fall protection

**Task 2:** Inspect existing electrical service to determine if it is sufficiently sized or rated for the PV system.

**Knowledge of:**
- Service rating (e.g., voltage, amperage)
- Busbar and main breaker rating
- Available breaker space
- Grounding method
- Electrical service equipment manufacturer (e.g., panel, transformer, CT cabinet)
- Voltage and current ratings on fuses as well as ac and dc switches
- Electrical principles
- Electrical codes

**Task 3:** Identify locations for system components to determine proposed PV system material needs.

**Knowledge of:**
- Inverter location
- Array locations
- Ac and dc disconnects
- Junction box
- Conduit routing and distance
- NEC and manufacturer clearance requirements
- Solar access
- Hazards (e.g., power lines, gas lines, meters)
- Utility requirements for disconnects

**Task 4:** Assess possible array mounting locations by visual inspection and by taking measurements to provide data for structural design and engineering.

**Knowledge of:**
- Roofing materials and terminology
- Structural framing, spacing, and spans
- Roof and attic access
- Roof condition and age
- Soil conditions and topography
- Underground obstructions (e.g., septic, gas lines, easements)
- Solar access
- Available roof and ground area
- Blueprints
- Measurement tools (e.g., compass, inclinometer, measuring tape, camera)
- Safety practices (e.g., ladder use, fall protection, roof protection)
Task 5: Perform shade analysis remotely or on-site to accurately determine expected production and optimize location for PV modules.

Knowledge of:

- a. Existing shading obstructions
- b. Future shading obstructions
- c. Seasonal and daily variations
- d. Whether rooftop analysis is necessary
- e. Incorporation of buffers
- f. Calculation of production within acceptable limits of third-party audits
- g. Impact of shade on solar systems
- h. Proper use of shade analysis tools

Task 6: Review site analysis with appropriate stakeholders to establish buy-in and consensus.

Knowledge of:

- a. Safety practices
- b. Existing site electrical limitations
- c. System component locations
- d. Shading
- e. Array location
Domain 3: Conceptual Design

Task 1: Recommend appropriate equipment based on site analysis and customer needs to provide optimized solutions.

Knowledge of:
- Efficiency, cost, and aesthetic differences
- Geographic location and climate
- Module selection
- Inverter selection based on array size and service voltage
- Products (e.g., batteries, optimizers)
- Websites that provide insolation data

Task 2: Recommend equipment location and layout by considering manufacturer recommendations, local requirements, prospect input, and project constraints to develop optimal solutions.

Knowledge of:
- Manufacturer specifications for inverter location and clearances
- Potential sites for inverters
- Potential sites for energy storage systems
- Future construction plans
- Type of monitoring system (e.g., broadband, wired)
- Conduit runs
- Noise level generated by equipment
- Risks of damage to equipment
- NEC requirements and local codes
- Cooling requirements
- Fire code requirements

Task 3: Plan system layout based on string sizing, module and inverter specifications, and environmental conditions to ensure code compliance and optimal performance.

Knowledge of:
- Module layout
- Electrical layout
- Array location
- Energy storage system location
- System layout
- String layout
- Roof setbacks
- Design software
- Inter-row shading
- NEC requirements and local codes
- Cooling requirements
- Fire code requirements
DOMAIN 3: CONCEPTUAL DESIGN

Task 4: Assess the type of interconnection and capacity of an existing electrical system by reviewing site analysis and utility requirements to determine if any changes are necessary.

Knowledge of:
- a. Maximum inverter output
- b. Maximum backfed circuit size
- c. Electrical service (e.g., upgrades, costs)
- d. Current ratings
- e. Line-side tap

Task 5: Determine mounting method and tilt angle by reviewing site analysis, equipment specifications, and resulting performance to optimize results or output.

Knowledge of:
- a. Roof type and material
- b. Roof pitch
- c. Roof height
- d. Roof obstructions (e.g., chimneys, plumbing vents, attic, air circulation, or hot vents)
- e. Vent pipe or vent stack rerouting
- f. Structural members (e.g., wood, steel, trusses, rafters)
- g. Space required under modules
- h. Impact on roofing warranties
- i. Type of roof penetrations and flashing
- j. Performance and aesthetic impact of various tilt angles
- k. Trenching considerations
- l. Local height restrictions
- m. Mounting systems
Domain 4: Performance Analysis

**Task 1:** Calculate system production by utilizing industry standard tools and considering site conditions and system installation characteristics.

**Knowledge of:**
- a. Area insolation data
- b. Area temperature data
- c. Impact of soiling
- d. Module name plate rating
- e. System losses (e.g., wire losses, diodes, module mismatch)
- f. Shade analysis
- g. Module operating temperature and air flow
- h. Component efficiencies (e.g., inverter, dc modules)
- i. Azimuth and tilt
- j. System availability
- k. Fixed-, dual-, or single-axis tracking
- l. System age or degradation
- m. System monitoring
- n. Time of use

**Task 2:** Identify factors that degrade system performance to set proper expectations throughout the life of the system.

**Knowledge of:**
- a. Module degradation over time
- b. Landscaping issues (e.g., tree growth)
- c. New construction
- d. Environmental issues (e.g., wildlife, pollution, oxidation, soiling)
- e. Monitoring systems (e.g., security, performance)
## Domain 5: Costs, Incentives, Savings, and Returns

**Task 1:** Identify applicable federal, state, local, and/or utility incentives to determine potential financial impact.

**Knowledge of:**
- a. Tax credits
- b. Feed-in tariffs
- c. Grants
- d. Depreciation
- e. Property tax exemptions
- f. Renewable energy credits (RECs)
- g. Performance-based incentives (PBIs)
- h. Rebates
- i. Tax deductions
- j. Transfer credits
- k. Sales tax exemptions
- l. Typical project costs
- m. Calculations for net investment cost after incentives

**Task 2:** Review utility tariff rates, fees (pre- and post-solar), and net-metering policies to estimate utility savings.

**Knowledge of:**
- a. Net-metering policies and zero-export rules
- b. Additional fees and charges due to solar electric system ownership
- c. Time-of-use tariffs
- d. Tiered-rate-structure tariffs
- e. Flat-rate tariffs
- f. Value-of-solar (VoS) tariffs
- g. Energy and demand charges
- h. Impact of solar on demand charges
- i. Impact of solar on energy charges
- j. Optimization of rate tariffs
- k. Future utility rate changes
- l. Calculations for electric bill savings
DOMAIN 5: COSTS, INCENTIVES, SAVINGS, AND RETURNS

Task 3: Conduct financial analysis with information acquired to provide financial returns.

Knowledge of:

a. Financial analysis for PV, storage, and PV-plus-storage applications
b. Operating modes (e.g., 100% self-consumption, peak shaving)
c. Financial impact of using a “Demand Controller” both with and without the PV system
d. Cash flow analysis
e. Net savings estimates (e.g., prospect’s avoided cost)
f. Ethical utility escalation rates based on historical data
g. Operating and maintenance expenses (e.g., replacement/repair costs for inverters, monitoring)
h. Development of multiyear timeline scenarios detailing costs/benefits
i. Internal rate of return
j. Simple return on investment
k. Years to payback
l. Prospects’ tax bracket and their ability to use the investment tax credit (ITC)
m. Pretax and after-tax benefits
n. Theoretical resale value and equity impact on property
o. Calculations for levelized cost of electricity (LCOE)
p. Suitable financing options for prospects (e.g., home equity loans, fixed and escalator leasing, power purchase agreements (PPAs), consumer solar loans, community-based financing and PACE, utility loans)
q. Results from qualifying prospects
r. Results from site analysis
s. Results from performance analysis
t. Ethical kWh production expectations over the life of the system
u. Financing vocabulary terms (e.g., principal, interest rate, APR, term, down payment, simple-interest loan)
v. Comparisons to other investments
w. Truth-in-lending provisions and requirements
x. Net present value (NPV)
y. Performance guarantees

Task 4: Quantify or explain the non-financial benefits proportional to estimated production by utilizing industry standard tools to further establish the value of solar assets.

Knowledge of:

a. CO2 avoidance
b. Tons of coal saved
c. Water saved
d. Miles not driven
e. Acres of trees saved
f. Barrels of oil saved
g. Energy independence benefits
h. Social benefits (e.g., cleaner air, health, climate change)
i. Job creation benefits
j. Benefits from building sustainable communities
k. Marketing and public relations benefits
l. Theoretical resale value and equity impact on property
m. Calculations for levelized cost of electricity (LCOE)

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Domain 6: Proposal Preparation and Presentation

**Task 1:** Create proposals detailing system size and layout, performance analysis, incentives, timelines, payment schedules, equipment, and financial returns to move the project forward.

Knowledge of:

a. Production estimates  
   b. STC dc system power rating  
   c. Average monthly electric bill savings estimates  
   d. Total cost, rebates, tax incentives, and net costs  
   e. Permit fees  
   f. Interconnection fees  
   g. Taxes  
   h. Variable costs  
   i. Payment schedules  
   j. Incentives paid over time (e.g., PBI, FIT, SRECs)  
   k. Construction timelines and milestone dates

l. Major equipment lists, power ratings, and part counts  
   m. Assumptions, special factors, and locations for equipment installation  
   n. Manufacturer data sheets  
   o. Documents required for completing sales  
   p. Financial benefits and/or financing  
   q. Non-financial benefits  
   r. Energy efficiency and conservation  
   s. Industry ethical standards

**Task 2:** Create sales presentations based on proposals to convert prospects into customers.

Knowledge of:

a. Presentation tools  
   b. Proposal or contract details  
   c. Documents required for completing sales
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