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# Development of Smart Grid Standards in Taiwan

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for

Smart Grid Industrial Technology Exchange between Taiwan and UK, 2011





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# Development of Smart Grid Standards in Taiwan

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Standards Studies in Taiwan Are Mainly for Two Purposes:

(1) For Domestic Application of SG ;

(2) To Match with Worldwide Trend of Development of SG Standards to Support Industry for SG Market.

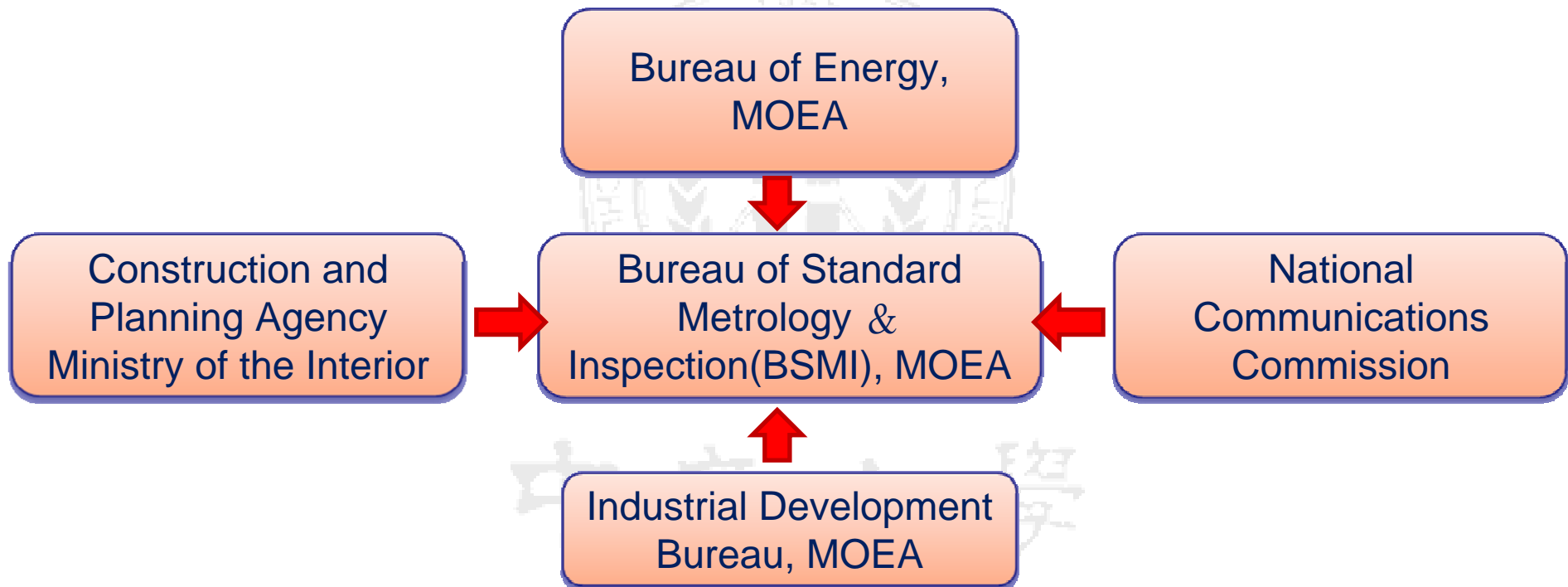




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## SG Standards Jurisdictional Bodies



Utility Standards(G/T/D/C), Communication Standards, Electric Vehicle, Building Automation, Home Automation, Microgrid etc.





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## Present Status

Generation, Transmission, Distribution, Customers, e.g., Advanced Meter Infrastructure(AMI), DA, WAMS etc.



Taipower's Procurement Specifications

Chargers for Electric Vehicle, PV Installation etc.



National Standards(made by Industrial Development Bureau, BSMI, etc.)

- Microgrid
- Smart Home
- Building Automation





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## Regulatory Standards under Revision

- ❑ **Installation Rules of Customer Owned Power System**  
(similar to National Electricity Code of US)
- ❑ **Grid Interconnection Rules for Renewable Generation Sources** (follows IEEE 1547)
- ❑ **Technical Rules for Building Design and Construction**





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## New Standards Being Developed

- Electric Vehicle Conductive Charging System Recommendation Practice –
  - Part 1 : **Installation.**
  - Part 2 : **Interface.**
  - Part 3 : **Safety.**

Drafted by Industrial Technology Research Institute(ITRI)  
for Industrial Development Bureau, MOEA





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## Standards Developed, Including

- ❑ **CNS15118-2** : Photovoltaic (PV) module safety qualification - Part 2 : Requirements for testing
- ❑ **CNS15119** : Photovoltaic system performance monitoring - Guidelines for measurement, data exchange and analysis
- ❑ **CNS15199** : Electrical installations of buildings - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems
- ❑ **CNS14274** : Wireless Communication Network Meter Reading Interface Unit for Automation Reading System





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## Taiwan's Master Plan on Smart Grid

- ❑ For Approval by MOEA in December, 2011.
- ❑ Prepared by Bureau of Energy, MOEA
- ❑ **Members of Working Group** : Green Energy and Environment Research Laboratories, ITRI、Taipower、Institute for Information Industry、Industrial Development Bureau、BSMI、NSC and Professors.
- ❑ **Contents of Master Plan Are Divided into** : Generation, Transmission, Distribution, Customer Services, Regulations, Industries
- ❑ A General Metering Is to Be Held in December to Discuss on The Master Plan







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## Working Groups on Standards Are Being Formed by BSMI

□ **Members of Working Groups** : Taiwan Electric Research & Testing Center 、 Center for Measurement Standards , ITRI 、 Telecom Technology Center 、 Electric Testing Center 、 Taiwan Institute of Economic Research(TIER)

□ **Working Groups Are Categorized into** : Smart Meter Upgrading 、 Electricity Usage Information 、 IP Communication Protocol 、 Wireless Communication 、 Grid Connection with Energy Storage Device 、 Interoperability of Plug-in EV 、 PLC to Integrate with Home Automation Communication 、 Cybersecurity 、 Standards Relating to Taipower





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## Progress of BSMI's Working Groups

- ❑ Visited Taipower and Identified Taipower Needs Including The Utility Topics to Work With Taipower.
- ❑ Visited Manufactures on Battery、AMI、DA、Substation Automation etc. and Identified Their Needs on SG Standards.
- ❑ For Taipower, The Needs Are on National Standards for Customers of Utility, e.g., Standards on Smart Home、Building Automation、EV、Microgrid etc.
- ❑ For Manufactures, The Needs Are Mainly on Testing and Certification.





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## Progress of BSMI's Working Groups

- Being Writing Up a Proposal for Implementation in 2012.
- The Project Contents Include : Joint Research on SG Standards with International Standards Development Organizations, Studies on Worldwide SG Standards Development Trends, Planning of Platforms to Test SG Appliances, in Particular, on Smart Home, Building Automation, EV, Microgrid etc.





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## Progress of BSMI's Working Groups

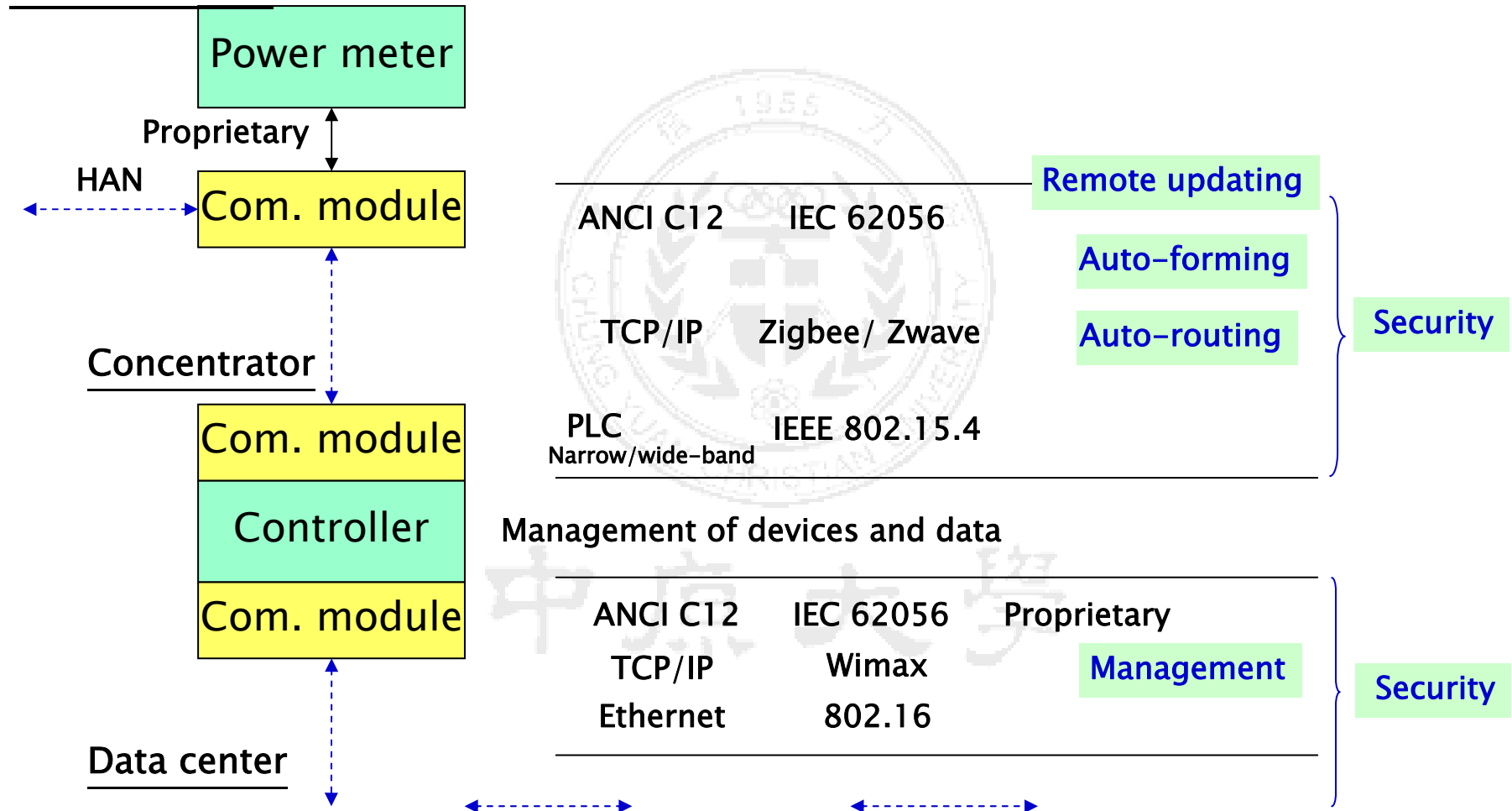
- Studies on Priority Action Plans(PAP) of NIST in Association with IEC Standards, e.g.,
- Standard Meter Data Profiles – ANSI C12(IEC62056), Access to Meter Data
- Standard Energy Usage Information – Additional Information to Assist Users Decision on Value-Added Application





# Communication Configuration

## Smart Meter



梁佩芳，台灣智慧電表技術發展現況與研發重點，兩岸智慧電網技術產業論壇，2011/7/25



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# Home Network Technologies Roadmap

	Home Appliance						Sever	
	Computer	Home Recreation		Life Support				Router/Home Gateway
		Appliance	Building	Sensor				
Upper layer Service		ITU-T H.iptv.hn	DLNA IGRS	ECHONET			HGI OSGi	
Middle layer Communication			UPnP	SCP LonMark	KNX		UPnP TR-069	
Lower layer Physical		Coaxial (MoCA)			Z-Wave			
		PLC(HomePlug, CEPCA, IPA)			Low Power			
		1000Base-T, 100Base-T, 10Base-T			Wireless			
		Wireless: IEEE802.11a/b/g/e/n, Bluetooth						

Data Source : NTT, Western Japan

Presented by : Professor H. T. Yang, for Smart Home Energy Management Pioneering Project of NSC

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# The Basic Concept- A standard Interface

Decouple the  
Appliance from the  
Communications  
and DR Logic



One Appliance Works with  
any Communication Device



One Communication  
Device Works with all  
Appliances

Accelerates Availability of  
DR-Ready Appliances for  
both HAN and DLC  
Programs

SDG&E AMI/PEV Architecture, IWC,

12-7-10



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## Progress of BSMI's Working Groups

### □ Energy Storage Interconnection

— Interconnection Standards, Communication Standards and Implementation Guidelines for Energy Storage(ES), Distributed Energy Resources(DER), Hybrid Generation-Storage System(ES-DER) and Plug-in Electric Vehicles(PEV)

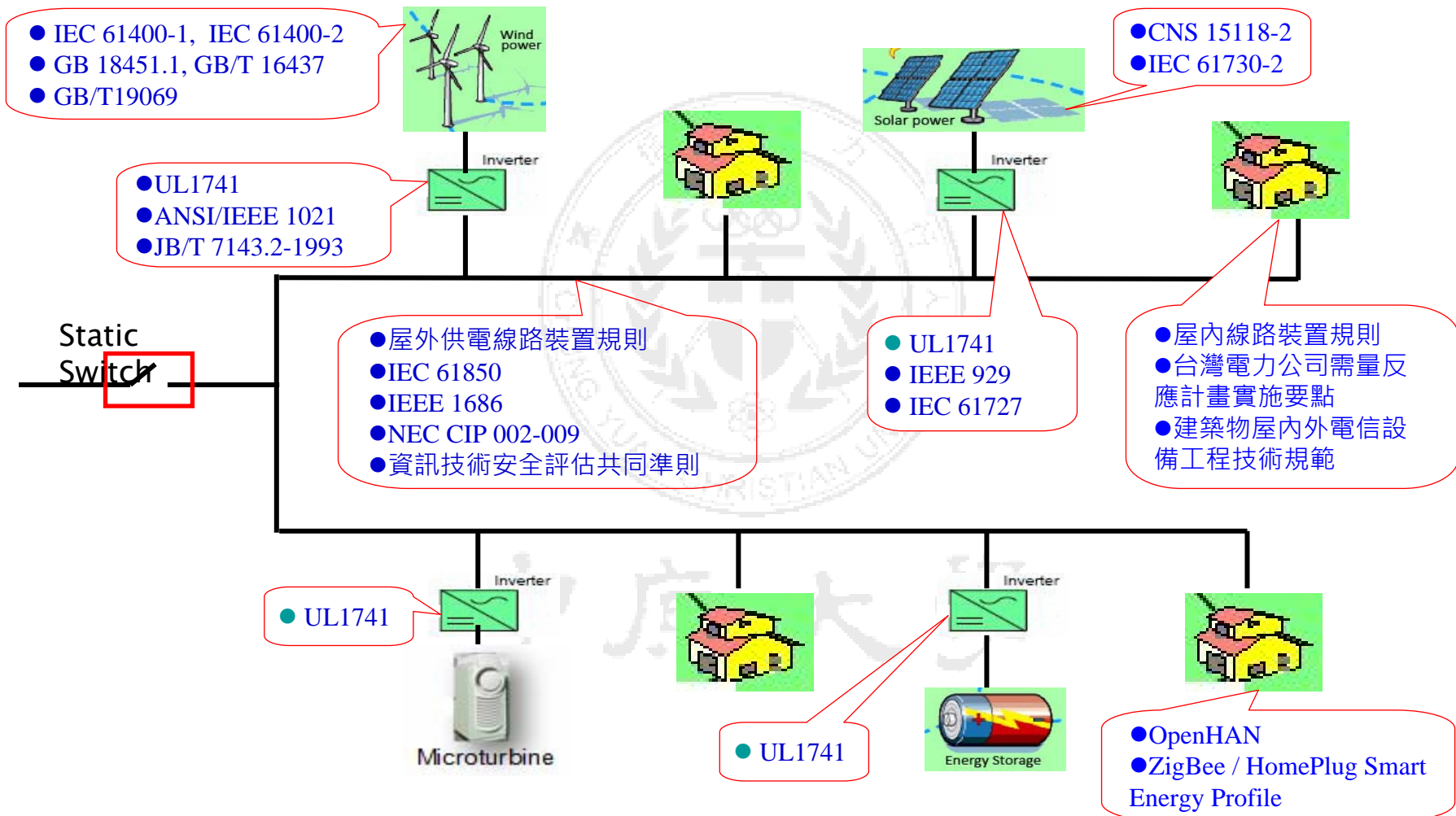
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# Microgrid Standards – Conceptual Model



許世哲，台灣智慧電網標準推動策略，兩岸智慧電網技術產業論壇，2011/7/25



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## Progress of BSMI's Working Groups

### □ Common Object Models for Electric Transportation

— Common Interoperable Model Being Needed for Price, DR, Signals for Curtailment, and DER across Markets

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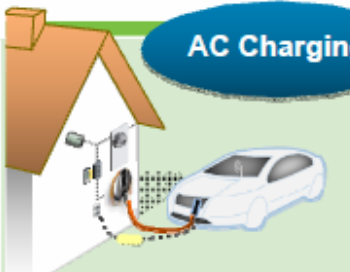


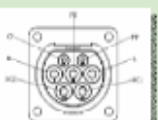







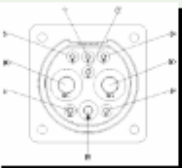

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# International Standards Comparison on Chargers of EV

	US	EU	CHINA	JAPAN
 <p><b>AC Charging</b></p>	Single-Phase (1Ø)  SAE J1772™	 IEC 62196-2 Type 1	 Type 2	 SAE J1772™*
	Single- or Three-Phase (1Ø or 3Ø) 	 IEC 62196-2 Type 2  IEC 62196-2 Type 3	SAE and IEC AC standards have common control signals	China charge couplers (not standard yet) have unique control signals and overall physical shape
 <p><b>DC Charging</b></p>	 SAE J1772™ 'Hybrid'	 IEC 62196-2 Type 2 'Hybrid'	SAE and IEC working toward harmonization of DC 'Hybrid' charge couplers	 Mode 3  JEVS G105-1993 (ChAdeMO)

\* SAE J1772™ AC connector has also been adopted by Korea and Australia





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# NEC、UL、SAE Standards of USA

**On Board Battery Charger UL 2202.** Conductive and inductive charging system equipment for recharging the storage batteries of electric vehicles

**J2929 EV and PHEV propulsion Battery System Safety Standard (Safety Performance Criteria)**

**Charging inlet UL 2251.** Plugs, receptacles, vehicle inlets, and connectors intended for conductive connection systems, for use with electric vehicles

**Charging plug SAE J1772™**

**National Electrical Code**  
Article 625 – Electric Vehicle Charging System  
I – General  
II – Wiring Methods  
III – Equipment Construction  
IV – Control & Protection  
V – EV Supply Equipment Locations

**UL 2231-1**  
Personnel Protection Systems for EV Supply Circuits

**UL 2231-2**  
Protection Devices for Use in Charging Systems

**UL2594**  
Outline for Investigation for EV Supply Equipment

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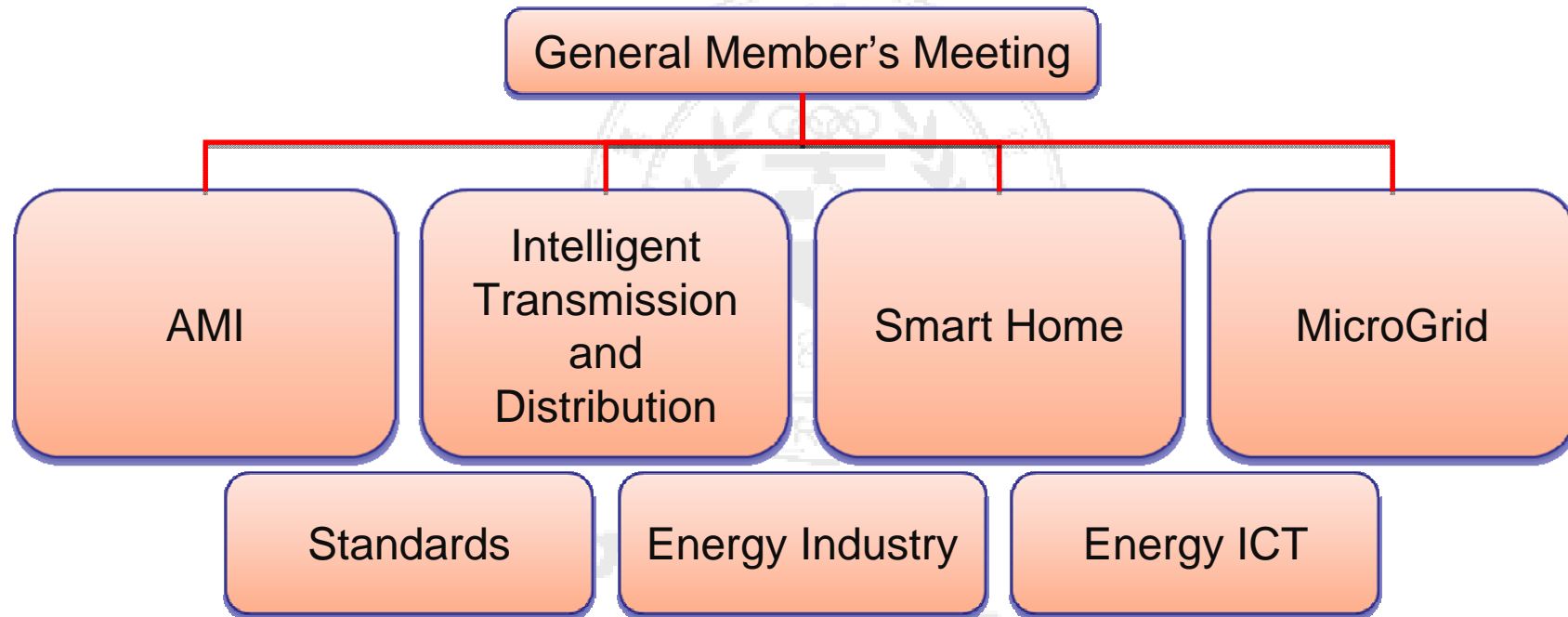




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## Taiwan SG Industry Association



Secretariat : TIER

Authorized from BSMI on Development of SG Standards

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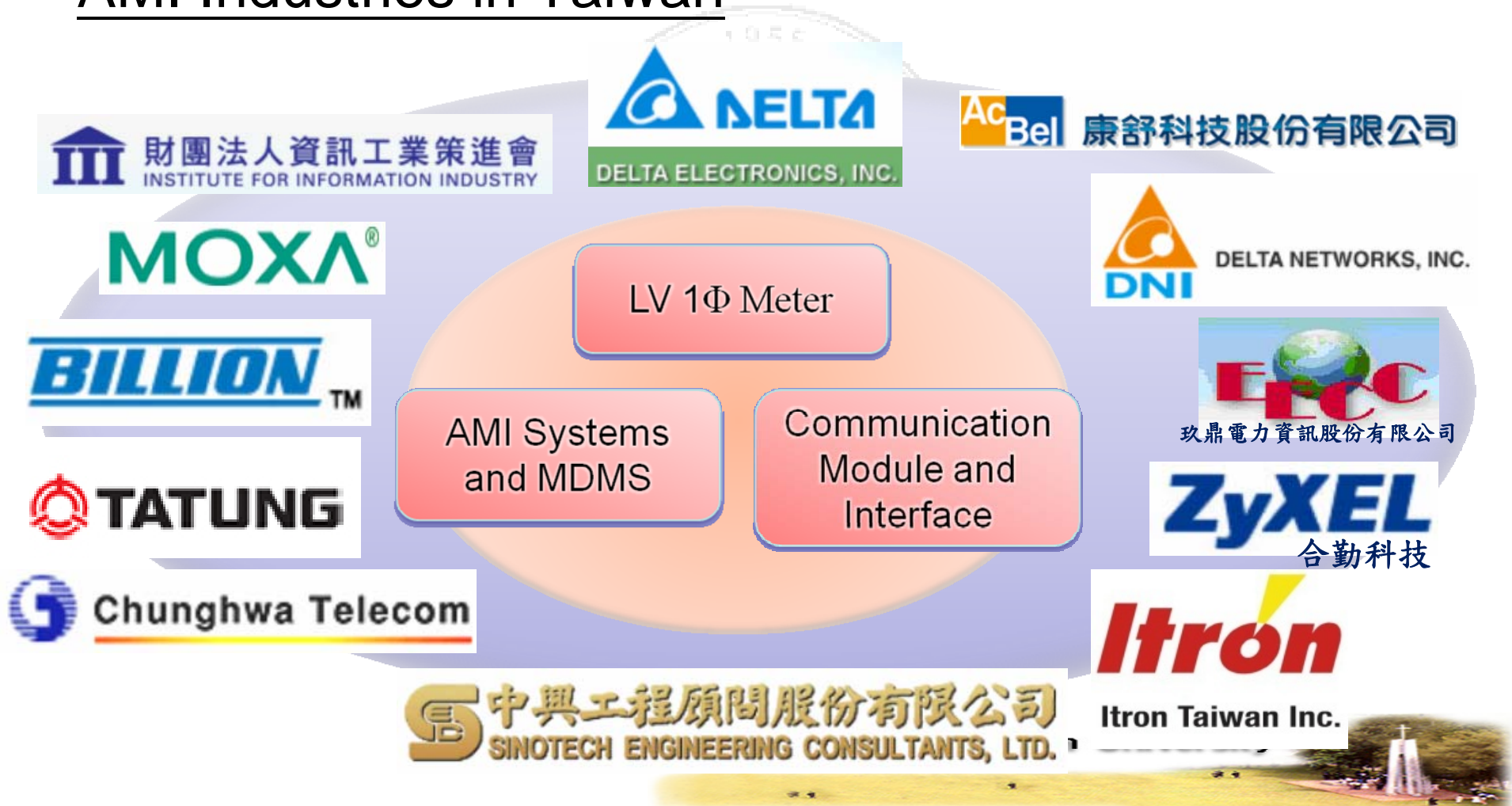




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## AMI Industries in Taiwan





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## SG Industries in Taiwan

In Addition to Utilities (Taipower & IPP's)

- **AMI** – LV 1  $\Phi$  Meter, Communication Module, Concentrator and Meter Interface, AMI System, MDMS.
- **Advanced DA** – Transformer Oil(Gas) Analyzer, Transformer, Recloser, Remotely Controlled Line Switch, RTU, FTU, SCADA, Communication Device.
- **HA** – Home Appliance, EV Charger, Chips, EMS, Communication.
- **Microgrid** – DG, EV Charger, Converter, Inverter, SCADA, Relay, Communication Devices

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## Concluding Remarks

- ❑ Taiwan Is One of The Largest Outsourcing Industry Components Maker in The World.
- ❑ To Gain The Business in The Future SG Market, Taiwan Must Be Fully Prepared Either as a SG Component Maker or Becomes The SG System Integrator.

Both Require The Understanding of SG Standards, and Their Development Trend.







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## Concluding Remarks

- ❑ BSMI, Is Being Studying The US and Europe Standards, and, in Particular, The Standards of China Mainland. BSMI Is Proposing a Research Project for Implementation in 2012 on Studies on SG Standards and on Development of Test Platforms
- ❑ To Become a Competitive System Integrator, Taiwan's Makers Should Gain Experience Through The Practice of Pilot Projects Offered by Government.
- ❑ Thereby Urge Government Offer More Pilot Projects Jointly with Taipower to Support The Earlier Integration of Makers.

