Toshiba’s Smart Community Initiatives and Strategies for Growth

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President and CEO

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Notes

This presentation contains forward looking statements concerning future plans, strategies and the performance of Toshiba.

These statements are based on Toshiba’s assumptions and beliefs in light of information currently available.

Furthermore, they are subject to a number of risks and uncertainties (including but not limited to changes in economic trends, intensive competition in the electronics industry, market demand, exchange rate fluctuations, taxation systems and other factors). Toshiba therefore wishes to caution readers that actual results might differ materially from our expectations.
Mega-trends Forming the Near-future and the Smart Community Business

Toshiba’s Total Solutions for Realizing Smart Communities

Toshiba’s Approach to the Smart Community Business

Global Business Structure

Towards Town Planning for the Future
Mega-trends Forming the Near-future and the Smart Community Business

- Toshiba’s Total Solutions for Realizing Smart Communities
- Toshiba’s Approach to the Smart Community Business
- Global Business Structure
- Towards Town Planning for the Future

The global population is expected to grow about 1.5 times by 2050, with most growth in the newly emerging economies of Africa and Asia.

- Emerging economies: energy and environmental problems from rapid population influx us to urban areas
- Developed Countries: Aging population, need for enhanced welfare, Stuck at high levels of per capita energy consumption

Source: UN, World Population Prospects The 2008 Revision.

As of end of October, 2011

Source: UN and World Urbanization Prospects The 2009 Revision.

Ratio of Urban Population

<table>
<thead>
<tr>
<th>Year</th>
<th>Urban</th>
<th>Non-Urban</th>
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<tbody>
<tr>
<td>1950</td>
<td>0.73</td>
<td>1.8</td>
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<tr>
<td>1975</td>
<td>1.51</td>
<td>2.55</td>
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<tr>
<td>2009</td>
<td>3.41</td>
<td>3.41</td>
</tr>
<tr>
<td>2025</td>
<td>4.54</td>
<td>3.47</td>
</tr>
<tr>
<td>2050</td>
<td>6.29</td>
<td>2.86</td>
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</tbody>
</table>

Source: UN, World Urbanization Prospects The 2009 Revision.
Increasing energy demand → resource shortages and price rises

Rise of resource nationalism, generating the issue of a gap between resource-rich and resource-poor countries

Huge influence on the world economy and corporate activity

Strengthening of regulations against global warming; more frequent unseasonable weather and natural disasters

Sources: IEA "World Energy Outlook 2001" Agency for Natural Resources and Energy data
Mega-Trends Changing the World
- Global Issues and Solutions -

**Economic Globalization**
- Instant Communication
- Expansion of Internet Community
- Digital Convergence

**Emerging Economies**
- Upsurge in Population
- Urbanization
- Traffic Jams
- Industrial Growth
- Changes in Diet
- Shortages of Resources
- Jumps in Resource Prices
- Increased Energy Demand
- Global warming

** Developed Countries**
- Aging Society with Low Birthrate
- Price rise in Medical Care
- Medical Care for Aging

Build Secure Information Infrastructure
Use of sustainable energy/resources
Vital needs support & healthcare *1

“Smart Community” provides solutions

*1 Vital Needs Support & Healthcare: Services to support vital elements such as water, air, food, and enhanced care for aged population and contribution to betterment of health
Global Smart Community Mega-Market and Business Scale

Global market in 2015 estimate: approx. 163 trillion yen*

- Europe: 41 trillion yen
- China: 57 trillion yen
- Japan: 5 trillion yen
- North America: 35 trillion yen
- Middle East: 7 trillion yen
- Africa: 3 trillion yen
- India: 4 trillion yen
- Asia Oceania: 7 trillion yen
- Central and South America: 4 trillion yen
- China: 57 trillion yen

Smart grid (incl. renewable) 217 projects
Smart community (redeveloped) 195 projects
Smart community (new) 73 projects

• Circle size: market scale
• Number: project count

* source: "Nikkei BP – World Smart City Conspectus 2012"
FY2015 Sales Target: 900 billion yen

Target market share in 2015:
8 trillion yen*  
(5% of 163 trillion yen)

Sales Target (FY2015)
900 billion yen

Sales targets by market

Japan: 37%
Outside of Japan: 63%

Developed countries: 34%
Emerging Economies: 29%

*Developed: North America 16; Europe 18
*Emerging: China 12; Asia 12; Middle East and Africa 2; others (3)

Sales Target by solutions

ICT and cloud: 12%
Smart facilities: 52%
Smart grid
Landis+Gyr: 33%
Smart transportation: 2%

Extensive experience and high market share in commercial level feasibility studies and experimental projects → moving steadily towards achieving target for FY2015

Source: "Nikkei BP – World Smart City Conspectus 2012" * Overlapping parts removed. Ratio is a Toshiba estimate.
* Ratio = Toshiba Projects / World Projects

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Towards Town Planning for the Future
Achieve a balance between the Comfort of the “individual” and a sustainable “community”
Cloud Services for Energy

Regional energy management in cooperation with main grid

- Nuclear power
- Thermal power
- Hydro power
- Wind power
- Mega-solar
- Large capacity storage battery
- PV and storage batteries support regional flexibility

Central power supply control center

Regional energy management

- Stabilization of renewable energy supply lowers power cost
- Response to demand system saves energy and boosts regional efficiency
Disaster-prevention cloud services at regional level

High level disaster-prevention solution by collaborative regional information

Regional disaster-prevention cloud

Traffic control, guidance

Class B river

CCTV camera

Class A river

Weather Bureau

Local broadcasting stations

Disaster prevention Office

River Office

Flood alarm

MP radar hyetometer

Laser shoot

Rain gauge

Person involved

Community medical collaboration

Water height projection

Inflow forecast

Person involved

Evacuation guidance for citizens

Sewage plant

Inflow forecast

Hospital

Prefectural Government

Traffic control, guidance

Real time situation assessment and cooperation in the region contributes to reduce damage

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Medical Cloud Services

Community medical care network for an aging society

- Data sharing and central storage
- Patient data management and preventive medicine
- Early treatment at clinic

Community medicine Network

Cloud service

Pathology report analysis, accounts analysis

Direct coding for Cloud that requires no decoding (re-encoding technology)

- Medical examination center
- Healthcare administration center

Strengthening local clinic functions improves medical care for the overall community
Cloud Services for Retailers: In-store purchases

Cloud solutions for retailers that realize smart shopping

- Internet storage, payment service personal data, transaction data on cloud, web fliers/promotion services
- Solutions services centered on Kiosks and digital signage
- Delivery service
  - Convenient shopping
- Easy payment
  - Payment Kiosk
- Low cost operation
- Service site for customers
- Internet Shopping
- Shopping at stores
- Shopping support
- Increased customers
- Merchandise management of inventory
- Retailers (Product control, Saving energy)
- Customer (Individual recommend)
- Increase average customer spending
- Information Kiosk
- Coupons, discount information
- Digital Showcase, Digital Signage
- Expand area cooperating with point system
- Saving energy for data updates
- Utilize tablet PCs
- Information on facilities, products
- Electronic bin card
- Cloud Service
- Cloud solutions for retailers
- Smart shopping
- Promote comfortable living with various devices and professional system integration

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Cloud Services for the Home

Provide users with multiple optimized services

- Water solution
- Heat solution
- Power solution
- Medical solution
- Transport solution
- Education
- Anti-crime
- Shopping
- Entertainment
- Advertising

Provide as a design service for a total smart life

For example, automatic scheduling of EV charge-discharge reflecting road conditions and travel times

Realize Home + EV total management:
Visualize (power saving 10%), DR (peak-shift 5-10%), charge and discharge of EV
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Towards Town Planning for the Future
Experimental and Commercial Smart Community

Over 20 projects worldwide, expanding smart community by each region’s problems

England
- Smart home for Bristol city EU PJ
- PJ for Isle of Wight

Central-Eastern Europe (Bulgaria)
- Smart community business study PJ

Tianjin, China
- Tenshin Eco city PJ

Shaanxi, China
- Smart community technical demonstration project
- Open collaborative research of environment technology by industry, academic, government

Kawasaki
- Kawasaki station area PJ

Yokohama
- Yokohama smart city PJ (YSCP)

Ibaraki
- Ibaraki city smart community PJ

Miyakojima
- New Energy System on Miyakojima PJ
- Miyakojima whole island EMS
- Miyakojima Kurimajima PJ

Malaysia
- Green township concept

New Mexico, USA
- Energy Systems Network PJ

Indiana, USA
- Japan-US Smartgrid demonstration project

[Project status]
- :Commercial 4☆
- :Investigate stage 4★
- :None: FS, Experiment 12

Italy
- Genova, Smart city Promotion plan
- Win smart grid for ACEA Distribuzione S.p.A, Rome *

Lyon, France
- Smart community demonstration project

India
- Manesar PJ
- Haryana PJ

Haryana state, India
- Delhi-Mumbai Industrial Corridor

China
- Smart Community business study PJ
- Smart Community technical demonstration project
- Smart Community (Re-development): 9
- Smart Community (New Development): 2

Toshiba Corporation, 2011
Example 1
Installation of New Energy System on Miyakojima, a Remote Island

Realize balance between installing large-scale renewable energy sources and stabilizing power supply
(PV 4MW, Wind 4.2MW; approx. 15% of maximum demand)

Current power generating system is expensive due to fuel costs

Potential application in industrial park, as it reduces private power generation → Extended to India

Peak cut, peak shift, frequency control

Cut fuel costs by reducing or stopping thermal generation
Example 2
Yokohama Smart City Project (YSCP)

Construct a society aiming to cut CO₂ emissions by 30% (*1)
Wide area energy management and demand response (DR)

Scale

Population: about 420,000 people
   (about 170,000 households)
Space: about 60 km²
Area: Minato Mirai area,
     Kohoku new town,
     Kanazawa Green Valley

Business Potential Evaluation

Investment Recovery
HEMS = 3 years
BEMS = 5 years

- HEMS (4,000 houses)
- BEMS (160,000,000 sqm)
- EV (2,000 sets)

-10% CO₂ reduction by visualization, 10% CO₂ reduction by DR,
total of 20% CO₂ reduction (*2)
- First DR for mansions at “Park Homes Okurayama”
- 15% CO₂ reduction by smart BEMS (*2)
- 5% improvement by building management (integrated BEMS) (*2)
- 30% CO₂ reduction per set (*4)

*1 Reduction target compared to Yokohama city action guideline FY2004
*2 Cut target before and after installing system
*3 Mitsui Fudosan Residential Co., Ltd.
*4 Estimation reflecting life cycle

☆ Smart city expo 2011
Urban City Award

CEMS: Community Energy Management System
BEMS: Building Energy Management System
HEMS: Home Energy Management System
SCADA: Supervisory Control And Data Acquisition

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Example 3
Lyon Project, France

Optimize solar power generation to bring EV into the community

Area: Lyon Confluence redevelopment area

- Save energy 25% + Generate energy (Solar: 15%, Cogeneration: 83%)
  - Generate more energy than is consumed
- Zero-emissions by use of renewable energy and sharing EV
- Visualize use in project area: homes, buildings and traffic

Achieve targets 5 years ahead of the EU’s 20-20-20 Plan*

* A target agreed among EU countries to reduce greenhouse gases by 20%, improve energy efficiency by 20%, and achieve renewable energy use of 20% by 2020, against 1990.
Example 4  
Actions to Revive Towns 1

“Industrial development and job creation” “Environmental harmony / cyclical form”

- Create hometown Iwate Sanriku which protects life and coexists with the sea and the land
- Secure safety, rebuild livelihoods, restore employment
  → Symbiosis with the environment through harnessing resources such as biomass
- Plan a disaster-resistant and safe town
- Reconstruct, not get stuck in "restoration"
- Construct advanced community that solves the problem of modern society → an optimistic town with state-of-the-art technology
- Develop disaster resistance and cultivate future towns
- Produce a new society by early promotion of renewable energy → create a smart living environment by housing relocation

Optimal smart communities blended with local characteristic are proposed.
Example 5
Actions to Revive Towns 2

Optimal Smart Community Proposal with Local Characteristics

A town in symbiosis with the environment through use of biomass resources (Iwate prefecture)

A town built with hope that incorporates state-of-the-art technology (Miyagi prefecture)

Ratio of renewable energy use in the project area
2010: 25% → 2015: 45%

To Reconstruct a community with improved lifelines, where people can sustain life for 3 days in the designated area after a disaster
Examples of Business Models 1
Energy Management

North America Energy Systems Network (ESN) Project

EV maker

effective use of vehicle batteries

Re-use market

Power sales trend

Large-scale wind power generation

Charge at night, sell in the daytime → increase profit

Energy for Sales

+ Operating cost
- Capital Investment

Inexpensive rechargeable battery

Sell renewable energy during daytime

Charge with cheap wind energy at night

Reduce capital investment by reusing EV battery

Maximize Profit

Increase Sales

Realize new business by using difference of power selling price and clean energy sources
- Investment recovery within 10 years with a 15 cent margin on power selling price
and a storage battery price of $500 per kWh -
Examples of Business Models 2
Build Smart Communities Through Redevelopment

India: Delhi-Mumbai Industrial Corridor, Manesar Project
Cogeneration realizes a low carbon industrial complex with reliable power supply

Create smart community covering all of Manesar
30% reduction in cost of off grid power; 60% reduction in CO2 by eliminating boiler and using cogeneration; 60% reduction in water demand by reuse of water

※EMS = Energy Management System

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Examples of Business Models 3
Build Smart Communities Through New Developments

Tianjin TEDA1x1 project
Implement growth model in cooperation with business developer

- Tax revenues
  - Community value
  - Operation cost
  - Construction investment
+ Tax revenues
  - Community value

Current industrial park
VS
Smart Industrial Complex

- low carbon society
- Increase corporate profit by saving energy and reducing utility costs

Increase community value by attracting enterprises, creating jobs, increasing population and activating the local economy

ESCO Business

New Business Opportunities

Investment in Smart Community and Smart Service businesses in construction

TEDA Nangang industrial zone recycling economy, public project garden
Source: TEDA homepage

TOSIBA
Leading Innovation

* TEDA: Tianjin Economic-Technological Development Area

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Global Business Structure

Towards Town Planning for the Future
Collaboration for Constructing a Total Solutions Structure

Transform the Business Structure from Analysis to Synthesis

Develop new solutions to meet mega-trends

Toshiba Group

- Toshiba TEC
- Toshiba Elevators & Building Systems
- Toshiba Solutions
- Toshiba Medical Systems
- Toshiba Lighting & Technology
- Toshiba Carrier

Alliance Partners

- IBM
- Veolia Transport
- Bouygues
- ESN Energy Systems Network
- UNISON

Basic infrastructure

- Cloud

Creative DNA to support rich life

Broad solutions and knowhow from analytical approach

Electricity Water Transportation Health Buildings and homes

Provide best mix of tailor-made solutions

Synthesis (composition)

ICT x Control technology x Sensing technology = Comprehensive engineering technology

Comfortable individuals and Sustainable community

Collaboration for Constructing a Total Solutions Structure
Further Enhancement of Cloud Business Platform

Formulation of global cloud services contribute to further development of smart community

ICT Cloud Platform
Common platform for application services

Common framework: customer management platform, multi-language, application platform, security, collective knowledge processing, etc.
Reinforce Smart Community Business Structure: Jan. 1, 2011

Integrate Group-wide ICT and cloud solution services

Products, Components
Control Systems
Information, Cloud services

Smart Community Div.
Infrastructure Systems Group
Power Systems Company
Social Infrastructure Systems Company
Toshiba Medical Systems Corporation
Toshiba Elevator and Building Systems Corporation

Digital Products Group
Home Appliances Group
Electronic Devices Group

ICT, Cloud solution
Cloud Solution Div. (new)
Toshiba Solutions Corporation
Landis+Gyr Acquisition and Operation

- Acquired: July 29
- Purchase price: $2.3 Billion
- Promote “local-fit” business in four regional markets

**Toshiba**

60%

**Holding Co.**

40%

**The Innovation Network Corporation of Japan (INCJ)**

**L+G board**

**Landis+Gyr AG**

**EMEA**

34%

**N.Am**

45%

**S.Am**

7%

**Asia-Pacific**

14%

**EMEA**

Sales $1.533Bln (2010)

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Purpose of Acquisition 1: Synergy with Toshiba’s T&D business

Together, both companies cover Smart Grid components

- Toshiba T&D
  - PV power generation
  - Transformer
  - GIS*1
  - Relay
  - MVSG*2
  - Storage
  - Battery
  - Home Photovoltaics
  - muEMS
  - Power distribution automation
  - Meter data management system
  - Smart meters

- Landis+Gyr
  - Market Share
    - 19% *3
    - 34%

*1 GIS: Gas Insulated Switchgear
*2 MVSG: Middle Voltage Switchgear
*3 North American market share of a Landis+Gyr Affiliate
Purpose of Acquisition 2: Utilize Landis+Gyr’s Global Presence

Landis+Gyr’s hubs and major customers

- **EMEA**
  - E.ON (Europe)
  - British Gas (UK)
  - ERDF (France)
  - ACEA (Italy)
  - City Power Johannesburg (South Africa)
  - etc.

- **North America**
  - Oncor (US)
  - AEP (US)
  - PSE (US)
  - Hydro Quebec (Canada)
  - etc.

- **Asia-Pacific**
  - SP Ausnet (Australia)
  - Ausgrid (Australia)
  - MGVCL (India)
  - State Grid Corporation of China (China)
  - etc.

- **South America**
  - Rede Group (Brazil)
  - AMPLA (Brazil)
  - LIGHT (Brazil)
  - Copel (Brazil)
  - etc.

A global presence, in over 30 countries with more than 8,000 corporate customers

⇒ Promote Smart Grid system to current customers
Example: Synergy from the Acquisition

Smart Grid system for Italy’s ACEA photovoltaic power supply for electric vehicle charge stand

Supply of Landis+Gyr's smart meters and Toshiba’s related products (photovoltaics, storage batteries (SCiB), charge stands, muEMS, etc.) for ACEA’s Smart Grid demonstration PJ.
Recovery of Investment
Sales and operating profit plan, excluding Toshiba’s existing businesses

Shorten 9 years initial plan to 7 years by realizing synergies

Realize Synergy
Landis+Gyr
Toshiba

Distribution Automation

Utility Needs + FDIR*1
HEMS + DLC*2
BEMS + BEMS

etc….

One-stop Solution

Utilize Landis+Gyr’s Bases

increases in both sales and profit

Sales

EBIT

(Unit: US$M)

Current Investment
US$1,620M

*1 FDIR: Fault-Detection, Fault-Isolation, and Recovery

*2 DLC: Direct Load Control
Targets of Smart Community Business

Provide total solutions from planning to construction and operation management

Plan and Design
In cooperation with developers and consultants, propose smarter way from master plan to detailed design

Operation and Management
ICT supports advanced operation and management

Construction
Conventional town planning
Deliver equipment for energy supply, transportation, health, water, buildings, homes, etc.

Business cycle
Smart community town planning
Construct infrastructure including energy supply, transport, health, water, buildings, homes, etc.

FY2015
900 billion yen

about
400 billion yen
at present

Outside of Japan
Japan

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Towards Town Planning for the Future
Towards the Future of Urban Development

**STEP 1**
- Verified and accumulated through demonstration PJ
- Technology validation
- Profitability verification

**STEP 2**
- Promotion by creating optimal consortiums
- Establish business model
- Strategic alliances
- Standardization
- Reduce cost by mass production

**STEP 3**
- Deploy commercialized business globally
- Expand private sector projects
- Funding
- Promote strategic alliances
- Develop business from EPC to service

Now

New development
Redevelopment
Restore

2STEP 3STEP