

## Myanmar Market Pulse

Sector Highlights: Renewable Energy, ICT, Textiles & Apparel

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**Myanmar embraces solar: 210-megawatt power plant, 2800 villages to be powered by the sun.** Thailand's Green Earth Power (GEP) recently announced the signing of a memorandum of understanding (MoU) with Myanmar's Ministry of Electric Power to build a US\$275 million solar plant near Naypyitaw. With a generating capacity of 210 megawatts, the plant would be among the world's largest solar power plants upon completion in 2015. Myanmar would see an increase in generating capacity of over 8% as a result of the project. GEP expects to sign a second MoU for another plant later this year. Meanwhile, government officials announced that more than 2800 villages in Mandalay Division, most lacking electricity today, have signed up for solar power. The regional government will provide loans to villagers to cover the cost of the US\$80 solar panels.

**Mobile phone and internet access set to improve.** After months of anticipation, Norway's Telenor and Qatar-based Ooredoo were recently announced as winners of licenses to build Myanmar's telecommunications infrastructure. While Telenor hopes to achieve nationwide coverage within five years, Ooredoo plans to provide 3G network access to 90% of the country. Mobile penetration in Myanmar is 9% today, among the lowest in the world; internet penetration stands at 1-3%. In June, Myanmar Posts & Telecommunications announced the solicitation of bids to develop a fiber-optic internet backbone. Cascade Asia expects ICT spending in Myanmar to double by 2018; much of the investment in the sector is dependent upon the successful rollout of basic communications infrastructure.

**Apparel industry boosted by revised trade policies.** With the ILO announcing a removal of all remaining trade restrictions against Myanmar and the country's re-admittance to the EU's Generalized System of Preferences (GSP) regime in recent weeks, the textiles and apparel industry is primed for higher growth. Myanmar's export earnings in the sector doubled during the first quarter of 2013 compared to the same period in 2012. In the United States, a public hearing was held in June to consider Myanmar's eligibility for GSP status, something opposed by several prominent human rights groups.

***Cascade Asia Advisors has identified renewable energy, information & communications technology and textiles & apparel as high-growth sectors in which foreign companies can tangibly engage in Myanmar's dynamic growth. Contact us at 360.358.3094 or [info@cascadeasia.com](mailto:info@cascadeasia.com) if you have questions about these sectors or about engaging in Myanmar more broadly.***

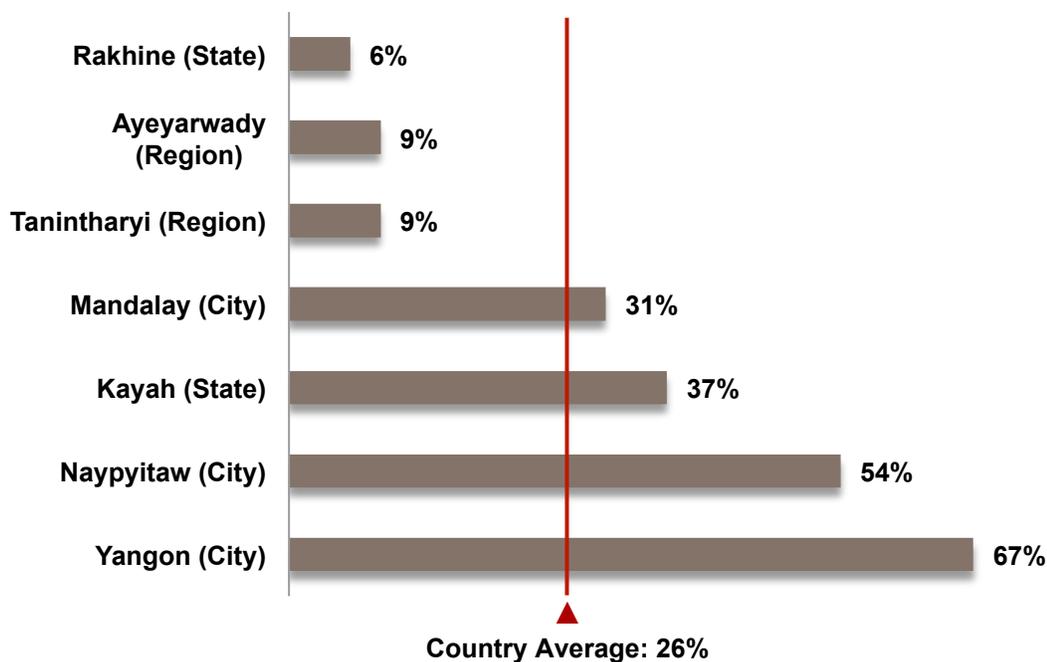
## Analysis

### Renewable Energy

#### Energy in Myanmar: more than oil and gas

Nearly 75% of Myanmar's 60 million people lack access to electricity. Even in Yangon, the country's largest city, a full 1/3 of residents are not connected to the grid; in Mandalay, the ratio rises to over 2/3. With such a large percentage of its population "off the grid," Myanmar is heavily reliant upon the burning of wood and kerosene to meet its heating and lighting needs. Some 75% of its energy comes from traditional biomass, yet the primary source of that biomass—the country's forests—is being depleted rapidly. The Asian Development Bank estimates that since 1990 Myanmar has lost 4,000 square kilometers of forests annually.

#### Electrification Rates in Myanmar



Source: Myanmar Energy Sector Initial Assessment, Asian Development Bank (2012)

With all the recent hype about the country's oil and gas reserves, one might assume that the solution lies in expanded fossil fuels extraction and construction of gas-powered plants. Yet because the former regime treated reserves as a means of acquiring foreign currency and not a source of electricity for its people, Myanmar is contractually bound to export much of its natural gas. (In 2010, 85% of the natural gas it produced was exported, much of it to Thailand.) Furthermore, Myanmar lacks adequate capacity to refine heavy crude oil, and its transmission and distribution systems are so poor that expanded capacity would reach very few in need. Given the country's vast, rugged terrain and widely dispersed population, connecting the bulk of the rural population to a central grid will take a decade or longer.

Instead of relying solely upon a centralized grid and expanded fossil fuels extraction to meet its energy needs, Myanmar must embrace renewables. Fortunately, the country's renewable resources are both abundant and diverse.

Although potential for geothermal and wind energy exists, the biggest immediate opportunities in the renewable sector involve hydropower, solar and modern biomass. Myanmar's Ministry of Electric Power estimates the country's hydropower potential to be over 100,000 megawatts (several dozen times greater than total capacity today); 300 locations on the four major river systems have been deemed suitable for hydropower projects. Blessed with abundant sunshine for much of the year, Myanmar stands to benefit from the falling cost of solar panels. Informal surveys conducted by Cascade Asia this spring suggested an appetite for solar projects. Already, solar installations both large and small are in the works. Myanmar is a major rice producer, and with 20% of the crop discarded as waste, rice waste could become a significant source of biofuels. Finally, with nearly 2,000 kilometers of coastline, tidal power is abundant, although the technology to harness it remains primitive and expensive.

In addition to opportunities involving the renewable resources themselves, Cascade Asia believes there is potential to develop "microgrids" in population centers outside the Yangon-Mandalay corridor. Though we do not see a centralized grid reaching the outlying areas for at least a decade, preparation for future connection to the grid is prudent. What's more, localized renewable sources can benefit a larger percentage of the population if microgrids are developed. For example, solar farms that deliver electricity to local populations via a microgrid are preferred over installation of panels on individual homes. Maintenance is easier and generation more consistent. Microgrids also enable hybrid delivery of electricity from multiple sources.

With hydropower in the mountains, abundant biomass in the central plains and tidal power along the coast, the resources exist to develop renewable energy in a localized fashion in Myanmar. Tying in microgrid development would result in improved consistency and flexibility today and integration to the national grid tomorrow.

### **Can Myanmar become a proving ground for algae-based biofuels?**

While rice, sugar cane and cassava are potential sources of biofuels in Myanmar, the country is also well situated to produce algae-based fuels.

The benefits of algal biofuels are many. Algae is easily cultivated and fast-growing, in some cases doubling in volume overnight. Thriving in sunlight and brackish water, algae can be harvested nearly year-round. Land unsuitable for agriculture can often be used for algaculture. Compared to crop-based biofuels, algae yields significantly more fuel on a per-acre basis. While soybeans produce roughly 50 gallons of oil per acre in one year, algae yields are approaching 10,000 gallons per acre per year. For the United States to meet half of its existing fuel demand using algal biofuels, just 1-2% of its existing cropland would be needed. Meeting that demand using corn or soybeans would require over 150% of existing cropland. Unlike corn and soybeans, algae can be used as a fuel source without displacing food production. Algal biofuels are carbon neutral; although burning them releases carbon dioxide into the atmosphere, algae growth absorbs it. Finally, algae-based fuels are non-toxic and biodegradable.

So what's the catch? In a word, cost. The promise of algal biofuels has been with us for several decades, yet the commercial viability of large-scale algae-based fuel production remains uncertain. After more than three years and \$100 million spent on an algae-based biofuels program, Exxon concluded in May that it was likely 25 years away from producing algal biofuels at scale. Companies like Florida-based Algenol, on the other hand, have made significant headway increasing per-acre fuel production, producing ethanol at a cost of just over \$1 per gallon. Algenol plans to produce 20 billion gallons of ethanol annually within 20 years, a number representing about 7% of current U.S. petroleum consumption. Sapphire Energy, another leading algal fuel producer, hopes to produce 50 million gallons of green crude oil per year by 2018. Still, these are unrealized goals, and doubts remain.

Myanmar could play a role in ending the commercial viability question. Climatic conditions and geographic characteristics, coupled with the country's current state of development and energy needs, make it an attractive place for development of fuel-producing algae farms. With abundant sunshine and large swaths of swampland unsuitable for agriculture, the vast Irrawaddy Delta is an attractive region for algaculture. Of course, some of the most productive algaculture involves advanced technology and high capital costs. In the short term, Myanmar may not see development of closed bioreactor systems where algae is cultivated in photobioreactors (e.g., plastic tubes) to prevent contamination and provide optimal exposure to light, carbon dioxide, etc. But raceway or open pond farms are already on the way.

Nation First International Development ASIA (NFIDAsia), the first American-led joint venture to be licensed by Myanmar's Directorate of Investment and Company Administration, announced in April that it would be partnering with Hisham Koh & Associates to develop algae farms in Myanmar. Although algae produced on the farms will also be used for food, cosmetics and pharmaceuticals, the possibility of extensive biofuels production exists. Demand for electricity and transport fuel is growing rapidly in Myanmar, yet capacity remains low. With algal biofuels on the cusp of commercial viability, timing could make the country a proving ground for algal fuels. If business and science continue to make advancements in algal fuel production in the next few years, it may be possible for Myanmar to make algae a key element of its energy portfolio.

Cascade Asia is bullish on the possibilities of algae-based biofuels in the region. Just last month, Thailand's state-owned oil and gas company, PTT, announced that it would commercialize algae-based fuels by 2017. After recalibration of what had become rather fanciful expectations, algae may be back.

## Information & Communications Technology

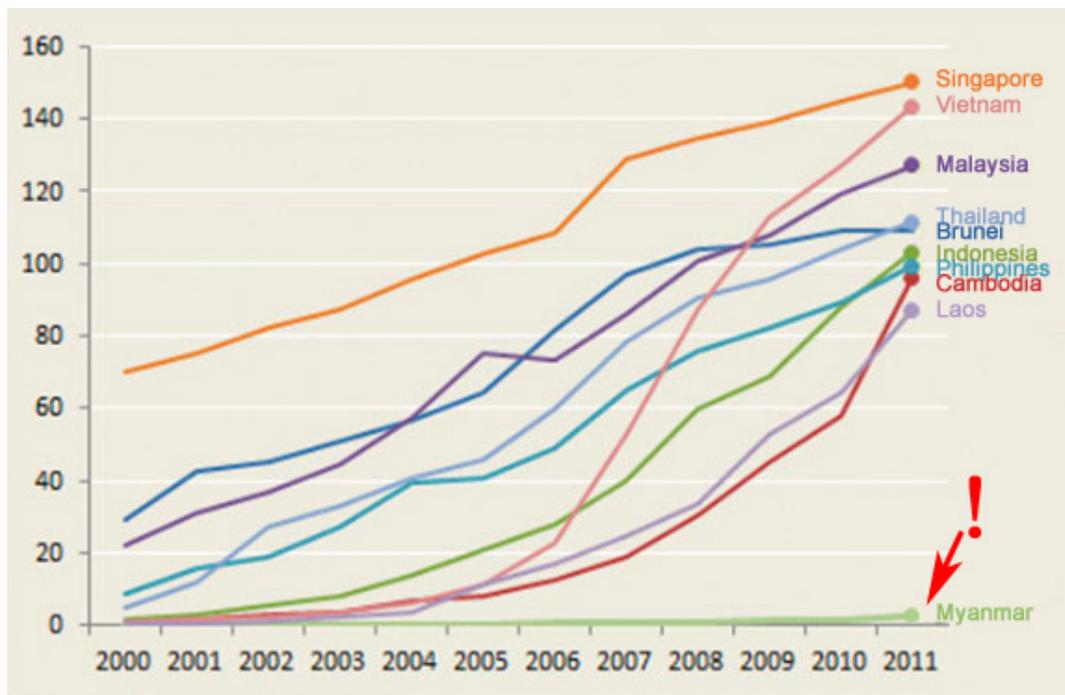
### **With better infrastructure on the way, it's time for regulatory and legal reform**

Infrastructure: it is a word you encounter frequently when evaluating market entry or investment in Myanmar. The country's roads are poor, electricity reliably unreliable, financial institutions primitive and telecommunications infrastructure inadequate. Myanmar's infrastructure—in nearly every sense—is abysmal, discouraging foreign investment and economic expansion.

In the information and communications technology space, there is significant potential but little momentum as a result of inadequate infrastructure. Mobile phone penetration stands at just 9%.

Internet access is a fraction of that. Just a few dozen technology startups exist. In June, Intel's venture capital arm, Intel Capital, cited poor internet connectivity and a primitive legal environment as justification for its decision not to invest in the country's technology sector. Yet the problem of poor infrastructure is being addressed. Foreign firms Telenor and Ooredoo have secured licenses and pledged to provide mobile voice and data service to 80-85% of the population by 2019. A joint venture between Myanmar Post and Telecommunications and Myanmar Economic Corporation, which quietly came to light amidst much fanfare surrounding the awarding of the foreign licenses, will also work to expand mobile penetration. Moreover, the Myanmar government recently announced a tender for bids to develop the country's fiber optic internet backbone, with licenses to be awarded later this year.

**Mobile Phone Subscriptions Per 100 People in ASEAN Countries**



Source: ICT Indicators 2012, ITU World Telecommunications

Separate from inadequate infrastructure, however, is the problem of an ineffectual legal and regulatory environment. A draconian electronic transactions law, enacted in 2004, remains in place. Electronic acts deemed detrimental to the security of the state or threatening to community peace, tranquility, national solidarity or culture are punishable by 7-to-15 years of jail time. The government retains the right to spy on its own citizens without caveat or judicial oversight. Intellectual property rights are weak and software piracy widespread. Before ICT investment can take off, such legal and regulatory issues must be addressed.

A draft telecommunications law, introduced last year, is expected to pass during the current legislative session. Yet the draft legislation is flawed. Price controls and government approval of suppliers remain in place, and the bill fails to adequately protect freedom of expression and individual privacy. Loopholes remain that could yield unfair advantages for state-owned companies and conglomerates. Domestic

organizations such as MIDO (Myanmar ICT for Development Organization) and Myanmar Computer Federation have been lobbying for amendments to the bill. Lawmakers have pledged to revisit the electronic transactions law once the telecommunications bill is passed, but we do not anticipate the former being replaced until 2014. In the meantime, providing internet-based services in Myanmar entails risks not present in neighboring countries.

Despite these challenges, Cascade Asia remains optimistic about the potential of Myanmar's ICT sector. Our experience in the region suggests the local population will embrace and learn the technologies; infrastructure will improve and innovation will blossom. Yet before foreign firms jump in wholeheartedly, the legal and regulatory framework must be reformed. Only then can they enter the market with confidence that they can compete on an even playing field, resolve disputes that may arise and act with the interest of their customers in mind.

## Textiles & Apparel

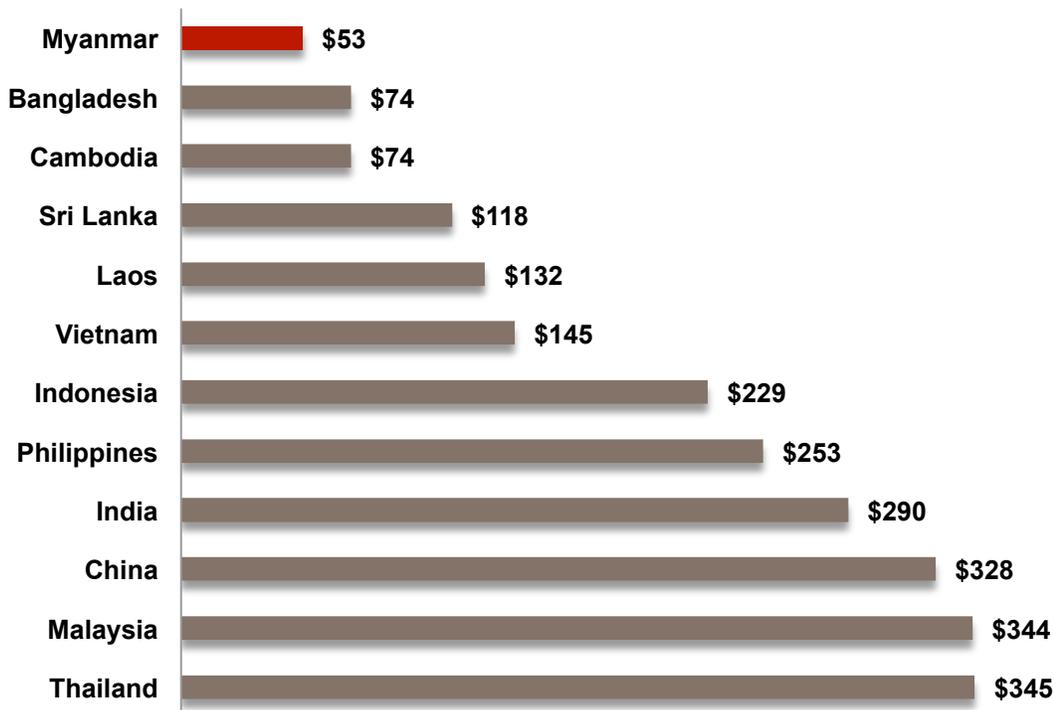
### Lessons from Bangladesh

After the catastrophic building collapse in April and a history of issues involving worker safety and rights, the garment sector in Bangladesh was dealt a serious blow on June 27th when the United States suspended its General System of Preferences (GSP) program allowing duty-free imports from the country. The textiles and apparel sector is the largest source of foreign exchange earnings for Bangladesh, with NAFTA countries purchasing 25% of its total exports. While the immediate impact of the move will likely be modest, the long-term implications for garment manufacturers may be significant. Already wary investors are more likely to look beyond Bangladesh to explore other options.

With western trade sanctions no longer in place, Myanmar stands to benefit. Manufacturing wages in the country are the lowest in Asia, and it has a long history in the apparel sector. Although the industry had been stagnant for a decade due in part to trade restrictions imposed by the U.S. and E.U. nations, it began to reemerge following the initiation of reforms in 2011. Export earnings in the sector, which have nearly doubled in just three years, are approaching US\$1 billion annually and should break the 2001 record this year, a high-water mark that predates western trade restrictions. More than 100,000 Myanmar citizens are employed in the garment sector today.

Yet as the increase in sector investment accelerates, we are concerned that too few lessons have been learned from the events in Bangladesh. Given the size of the Myanmar population and state of its economy, manufacturing wages should remain low relative to other countries in the region. Myanmar is likely a decade away from pulling even with its low-wage neighbors, although ASEAN integration in 2015 may alter the dynamics. Manufacturers can count on low-cost labor for the foreseeable future, but the Myanmar people expect that reforms will yield reasonable working conditions and preservation of basic rights. They are open to western investment in part because they believe the practices of western companies and regulations imposed by their governments will improve working conditions and the social impact of development.

**Average Monthly Wages for Manufacturing Workers (U.S. Dollars)**



Source: Japan External Trade Organization (2012)

Firms in the textiles and apparel space must not be shortsighted. The costs associated with labor unrest are high, the potential for governments to inflict economic pain in response to factory fires or child labor very real. Furthermore, governments must work to ensure that the Myanmar people benefit from investment in the sector. New labor laws passed by the Myanmar legislature in 2011 and 2012 established reasonable parameters for unionization and the handling of labor disputes, yet building codes, child labor laws, relevant training programs and enforcement of existing laws must all improve. The U.S. government has imposed unprecedented reporting requirements on American firms investing in the country to increase transparency, reduce corruption and ensure that engagement preserves the local environment and benefits the people.

The textiles and apparel sector is not as sexy as some, but it can be an important enabler of a country's development. Sweatshops do exist, yet we've seen millions of laborers lifted out of dire poverty in Indonesia, Vietnam, Cambodia and elsewhere in the region as a result of manufacturing jobs in the garment sector. With wages in China less competitive and Bangladesh still grappling with its problems, Myanmar could well become a major player in the sector. Consistent electricity aside, the biggest impediment to long-term success may be repeating the mistakes of the past. If such mistakes can be avoided—and workers in the garment sector are able to work in safe environments and retain their dignity and basic rights, the country could remain a sector leader for decades to come.

***For more details or to discuss this analysis in more depth, please contact us at 360.358.3094 or [info@cascadeasia.com](mailto:info@cascadeasia.com).***

## Upcoming Events

### **September 3-4: Myanmar Energy Investment Summit 2013**

*Yangon, Myanmar*

This international summit is targeting over 300 delegates from 25 countries representing the energy sector. Companies involved in hydropower, water resources, energy and power sectors are invited to the conference. The goal is to provide a platform for potential investors to gather in Yangon to be updated on market potential and development plans for the energy sector in Myanmar, and the implication of new economic regulations arising from the latest parliamentary decisions for the energy sectors. To register, visit the [summit web site](#).

### **September 10-11: Myanmar Global Investment Forum**

*Naypyitaw, Myanmar*

Myanmar's sweeping economic reforms and new Foreign Investment Law are attracting international capital into the country's key sectors. Myanmar is ready for foreign partnerships and investments. The Euromoney Myanmar Global Investment Forum offers international participants an ideal platform to connect with the country's government and business leaders. [Learn more and register here](#).

### **September 23-24: Asian Forum on Corporate Social Responsibility**

*Bali, Indonesia*

The Asian Forum on Corporate Social Responsibility, to be held in Bali, Indonesia, from September 23 to 24, 2013, will highlight the challenges of inclusive growth in the region in discussions and panels involving CSR experts and corporate executives from Southeast Asia, India, China, Australia, Europe and the US. For more information and registration details, visit the [forum web site](#).

### **October 8-9: Total Payments Asia 2013**

*Bangkok, Thailand*

Total Payments Asia 2013 is the meeting place for Myanmar, Thailand, Vietnam, Laos and Cambodia's emerging payments community. The event runs over two days on October 8 and 9, 2013, focusing on the expectations of the digital customer, emerging payment technology and the new disrupters and innovators in the payments sector. To learn more or register, visit the [conference web site](#).

### **November 23-24: Developer Conference Yangon 2013**

*Yangon, Myanmar*

The theme for this year's 2013 Developer Conference Yangon is "Leap Forward," which calls for the IT industry in Myanmar to not only "leapfrog" but also "move forward" in both technology and system changes. The conference is open to all IT professionals. Visit the [conference web site](#) for more information.

## In the News

### General Politics, Finance & Economics

- [Myanmar Faces Difficult Balance in Financial Overhaul](#), *The Wall Street Journal* – August 10, 2013
- [Myanmar sets up panel to review constitution but concerns remain](#), *Radio Free Asia* – July 26, 2013
- [Myanmar enacts new central bank law](#), *Channel NewsAsia* – July 12, 2013
- [The Face of Buddhist Terror](#), *TIME Magazine* – July 1, 2013
- [U.S and Myanmar reach bilateral trade agreement](#), *Eleven Myanmar* – June 28, 2013
- [Burma's Currency Continues Its Downslide](#), *The Irrawaddy Magazine* – June 28, 2013
- [Myanmar's Suu Kyi: 'I want to run for president'](#), *CNN* – June 6, 2013
- [State Department Details Myanmar Investment Reporting Requirements](#), *The Wall Street Journal* – May 23, 2013

### Renewable Energy

- [Renewable Energy in Myanmar: a Complicated Story](#), *Yale University* – August 14, 2013
- [PTT plans to commercialise algae-based fuel by 2017](#), *The Nation* – July 8, 2013
- [2,800 villages in Mandalay sign up for solar energy](#), *Mizzima News* – June 28, 2013
- [Renewable Energy in Myanmar: Not Just Clean, It's Necessary](#), *Renewable Energy World* – June 18, 2013
- [Myanmar works to turn the lights on -- and keep them on](#), *CNN* – June 12, 2013
- [San Diego-Based Algae Biofuel Strikes 'Milestone' Deal With Oil Giant](#), *KPBS.org* – June 7, 2013
- [New Energy Architecture: Myanmar](#), *World Economic Forum* – June 5, 2013
- [Myanmar to light up world's third largest solar plant](#), *Mizzima News* – May 8, 2013

### Information & Communications Technology

- [Military makes telecoms move](#), *Myanmar Times* – July 31, 2013
- [Burma to Replace Controversial Electronic Transactions Law](#), *The Irrawaddy Magazine* – July 15, 2013
- [Myanmar's first home-grown social media site launches](#), *Mizzima News* – July 9, 2013
- [Law experts express doubts over Myanmar telecom bill](#), *Eleven Myanmar* – July 2, 2013

Burma's Mobile Phone Users to See Major Drop in Call Fees, *The Irrawaddy Magazine* – June 28, 2013

Telenor, Ooredoo win telecoms bidding war, *Mizzima News* – June 27, 2013

Debate Over Role of the Internet in Developing Burma, *Tech President*, June 26, 2013

How can “Open Development” help Myanmar? Workshop stimulates discussion on using data to improve lives, *The World Bank* – June 25, 2013

Decades-old bets in Myanmar's tech industry finally reap rewards, *Myanmar Business Network* – June 15, 2013

Local developer aims to bring mobile apps to Myanmar, *PC World* – June 14, 2013

After telecom license, Myanmar to invite bids for Internet services and fiber optic network, *Myanmar Business Network* – June 14, 2013

Microsoft Forms Partnership in Myanmar, *The Wall Street Journal* – June 6, 2013

Myanmar's first data center to come within a year, *News in Myanmar* – June 5, 2013

## Textiles & Apparel

Myanmar's garment industry receives growing foreign investment, *Eleven Myanmar* – August 13, 2013

Burmese Garment Workers Protest Over Wages, *The Irrawaddy Magazine* – August 6, 2013

India to help revive 300 Apparel factories in Myanmar aided by SITRA, *Myanmar Business Network* – June 26, 2013

Myanmar's clothing industry promises growth, *Eleven Myanmar* – June 18, 2013

Sixteen companies granted to operate the garment industry with CMP system, *Eleven Myanmar* – June 15, 2013

After Bangladesh Tragedy, Questions for Burma's Garment Sector, *The Irrawaddy Magazine* – June 11, 2013

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