L&P

Newsletter No. 210 (EN)

# Renewable Energy in Thailand
# -
# The Energy Plan 2036

January 2023

L&P

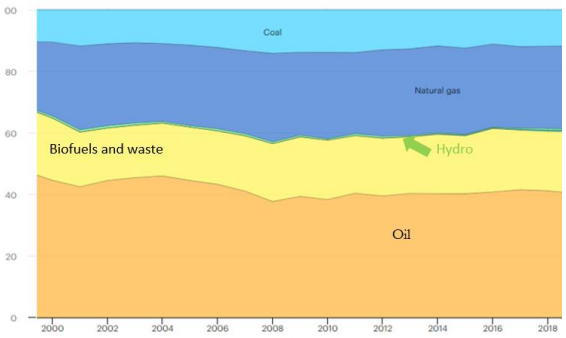
## Table of Contents

**Please note:** All currency exchanges are rounded and based on the exchange rate as of January 2023.

**Abstract:**
The following newsletter will give an overview on the situation in Thailand's energy sector as of 2022, particularly the Energy Plan 2036, the investment promotions provided by the Thai government, and the restrictions on foreign investors as well as available exemptions.

## I. Introduction

Thailand's current energy consumption is mainly covered by fossil fuels, particularly gas and oil.




Tab 1: Total energy supply by the source of Thailand 2000 - 2018.
Source: International Energy Agency (IEA)

Renewable energy development in Thailand is multi-faceted.[1] The electricity industry's total renewable energy generation capacity has increased twofold since 2012. Biomass power plants (approx. 29 %) and solar (approx. 25 %) as well as hydropower (approx. 25 %) make up the majority, followed by wind (approx. 13 %), biogas (approx. 5 %) and municipal solid waste (approx. 3 %).[2]

## II. The "Energy Plan 2036"

The "Energy Plan 2036" (entered into force in September 2015) mainly intends to reduce disadvantageous dependencies on fossil resources. In addition, it focuses on environmental and climate protection. Predictions particularly anticipate a rise in sea levels that would have dangerous consequences for the capital Bangkok, where almost every sixth Thai is living. Even today, natural disasters and environmental damage in Thailand have negative costs for the entire society. The floods of 2011, for example, caused damages of around 47 billion €.

The Thai government's goal is to increase the ratio of renewable energies to total consumption by 30 % by 2036. The Thai prime minister has recently announced that greenhouse gas emissions shall be reduced by 20 - 25 % by 2030.

[1] International Trade Administration of U.S.A, Energy Resource Guide (Thailand), 2021.

[2] ibid.

## 1. Political Plans

### a) Thailand Integrated Energy Blueprint ("TIEB")

The Thai government has developed the so-called Thailand Integrated Energy Blueprint or (**"TIEB"**) consisting of the following five objectives:

1. Renewable energies shall become a major part of the national energy supply to replace fossil fuels and oil imports.
2. Strengthening of the national energy security.
3. Establishing facilities for alternative energy production on the communal level.
4. Nationwide support for renewable energy production.
5. Promotion of competitiveness through research and development.

### b) Plans and indicators

The TIEB includes the following independent plans:

| The independent plans of TIEB | Status of plan |
|---|---|
| - *the Alternative Energy Development Plan 2018 - 2037 (**"AEDP"**)*[3] | Amended as of Oct. 2020 |
| - *the Power Development Plan 2018 - 2037 (**"PDP"**)*[4] | Amended as of Apr. 2019 |
| - *the Energy Efficiency Plan 2018 - 2037 (**"EEP"**)*[5] | Amended as of Oct. 2020 |
| - *the Gas Plan 2015 - 2036(**"GP"**)* | Effective |
| - *the Oil Plan 2015 - 2036(**"OP"**)* | Effective |

The government also plans to amend the Gas Plan 2015 - 2036 (**"GP"**) and the Oil Plan 2015 - 2036 (**"OP"**) to align with the new Power Development Plan 2018 - 2037 (**"PDP"**).[6]

During the amendments and updates of other plans, the plans 2015 - 2036 remain in force. The Alternative Development Plan 2018 - 2037 (**"AEDP"**) was adopted by the National Energy Policy Council on 19 March 2020 and defines goals for increasing renewable energy from the current 7,300 MW to almost 30,000 MW by 2037.

The following capacities are envisaged for the respective sectors:

(1) Solar energy: 12,139 MW
(2) Wind energy 2,989 MW
(3) Hydropower: 3,228 MW
(4) Waste-to-energy: 975 MW
(5) Biomass: 5,790 MW
(6) Biogas: 1,565 MW
(7) Hydro-floating solar hybrid projects: 2,725 MW

The Power Development Plan 2018 - 2037 is aimed to be amended every 5 years and outlines the strategic goals for Thailand's energy sector namely:

(1) security of supply
(2) profitability and
(3) eco-friendliness.

The Energy Efficiency Plan 2018 – 2037 (**"EEP"**) aims to reduce the energy intensity (consumption divided by GDP) by 30 % by 2036. For the following the Alternative Energy Development Plan is the most relevant.

[3] The AEDP 2018-2037 has been approved by the Cabinet on 20 October 2020.

[4] The PDP 2018-2037 has been approved by the Cabinet on 30 April 2019.

[5] The EEP 2018-2037 has been approved by the Cabinet on 20 October 2020.

[6] Announcement of the Energy Policy and Planning Office (EPPO) on 2 May 2019.

**c) Solar Energy in Germany**

Changes in the amended Renewable Energy Sources Act ("EEG 2023") that recently came into force have made photovoltaics more interesting again for private households. This year 7 GW, next year 9 GW and in 2026, 22 gigawatts of new plants are the ambitious expansion target. Regarding remuneration, a distinction must be made between feed-in in of excess power (exceeding producer's own consumption) and full feed-in. The following feed-in tariffs are intended as an incentive.

(1) Excess power:
Systems up to 10 kw peak performance ("**kWp**") receive 8.2 cents per kWh. Larger systems receive 7.1 cents per kWh.
(2) Full feed-in:
Systems with up to 10 kWp receive 13 cents per kWh. If the system component exceeds this value, this additional amount is remunerated at 10.9 cents per kWh.

The average consumption of electric energy in 2021 per capita in Thailand amounted to approx. 2,600 kWh[7]. For comparison, in Germany approx. 6,700 kWh were consumed. The consumer price per kWh in Germany increased within the last year by 43 % to now approx. THB 16.36 (approx. 0.44 €) per kWh, whereas in Thailand the price remained low at THB 3.72 (approx. 0.10 €) per kWh. The purchasing price for a solar system with a capacity of 8 kW in Germany is roughly at THB 446,000 (approx. 12,000 €), and in Thailand the price is around THB 370,000 (approx. 10,000 €). Internal rate of return in Thailand is in the range of 9 % - 11 % with a payback period of approx. 10 - 11 years,[8] while in Germany the payback period is slightly higher (approx. 13 years) and return on investment is anticipated to be between 3 % and 6 %.[9]
The Thai Ministry of Energy and the prime minister are in charge of decisions on energy policy and oversee the following authorities on the planning and implementation:

| Authorities | Responsible for |
|---|---|
| *Energy Policy and Planning Office (**"EPPO"**) of the Ministry of Energy* | development of the energy sector's fundamental strategies. |
| *Department of Alternative Energy Development and Efficiency (**"DEDE"**) of the Ministry of Energy* | promotion of renewable energies and investigating possibilities to use untapped potentials. |
| *Electricity Generating Authority of Thailand (**"EGAT"**) of the Ministry of Energy* | operates most of the power plants and energy infrastructure. |
| *Energy Regulatory Commission (**"ERC"**)* | serving as the regulatory and supervisory body for the Thai energy market. |
| *Metropolitan Electricity Authority (**"MEA"**) and Provincial Electricity Authorities (**"PEA"**)* | purchasing energy from the EGAT. The MEA provides power to the Bangkok metropolitan area, and the PEA to the rest of the country. |

[7] kWh = electricity used for one hour continuously.
[8] Bangkok Thonburi University.
[9] Stiftung Warentest; This is how photovoltaic pays off: https://www.test.de/Solaranlage-Gute-Renditen-sind-moeglich-und-so-gehts-5250676-0/, accessed on 30.09.2022.

### III. Foreign Business Act and Board of Investment

Foreigners doing business in Thailand are generally subject to the restrictions of the **Foreign Business Act** B.E. 2542 (1999) (**"FBA"**). According to the FBA, foreigners are all natural persons without Thai citizenship, juristic persons not registered in Thailand, and juristic persons registered in Thailand with at least 50 % of shares held by foreign natural or juristic persons. However, companies promoted by the Board of Investment (**"BOI"**) are exempt from most Foreign Business Act restrictions, and foreigners can hold up to 100 % of shares in promoted entities. Apart from the BOI promotion, foreign owned companies can only access such advantages if they are situated in designated Industrial Estates or if they receive a Foreign Business License from the Ministry of Commerce. In addition, BOI promoted entities are allowed to buy and own land, as far as required for the project. Furthermore, the employment of foreign experts is facilitated as far as required for the project, and work permits will be granted rather hassle-free. Non-BOI-promoted companies must fulfil certain capital requirements to employ foreigners, i.e., having a registered and fully paid-up capital of THB 2 million (approx. 55.000 €) per work permit.

### IV. Promotions

There are currently two promotion schemes available for producers of renewable energy:

1. The so-called Feed-in-Tariff (**"FiT"**) provides that energy producers receive a fixed price for the energy they sell to the Metropolitan Electricity Authority (**"MEA"**) or Provincial Electricity Authorities (**"PEA"**).[10] The MEA or PEA conclude a so-called Power Purchase Agreement (**"PPA"**) with the energy producer, which guarantees the Feed-in-Tariff for a fixed period. The duration of support regarding the individual Feed-in-Tariffs is 20 years.

In general, it can be observed that in Thailand the legal framework and the necessary infrastructure are advantageous, but the government is currently making only tentative efforts to switch to renewable energies. At the moment, very few Power Purchase Agreements are offered. However, feed-in regulations are still in force. It remains uncertain if and when energy suppliers will conclude Power Purchase Agreements with the private sector on a larger scale.

2. The Board of Investment offers various investment promotions, such as the exemption of corporate income tax[11] for up to 8 years or exemption from import duties on machines and raw materials.

#### 1. Solar Energy

With 2,600 hours of sunshine per annum, Thailand enjoys roughly 1,000 hours more than Germany. Solar power is a resource abundantly available in Thailand, but so far, its potential is mostly untapped. Currently, only approx. 3,000 MW of commercial solar energy is being produced. In comparison, Germany boasts a capacity of 62,000 MW,

[10] The *FiT-Scheme* replaces the previous *Adder-Scheme* where a bonus on top of the regular price per kWh was paid.

[11] The corporate income tax rate in Thailand is currently 20%.

aiming to expand it to200 GW by 2030. Thailand, according to the Power Development Plan 2018 – 2037 and the Alternative Energy Development Plan 2018 - 2037 aims to increase production to 12,139 MW by 2037.

Whereas in 2013 not a single solar cell had been installed, the total of newly built cells increased every year and reached the capacity of 3,100 MW in 2017. This is partly because costs in the solar energy market have fallen by 85 % in the last ten years, making solar cells one of the most competitive energy sources. This opens possibilities for the implementation of large-scale projects, such as the "Ubol Ratana Dam Hydro-Floating Solar Hybrid Project". Since 2014, some restrictions have also been lifted for private investors to minimise administrative congestion and costs.

On 22 October 2014, the Ministry of Industry adopted a guideline whereby rooftop photovoltaic facilities no longer require a factory permit reducing administrative restrictions especially for private investors.

**a) Feed-in-Tariff**

In 2013, the Energy Policy and Planning Office (**"EPPO"**) decided to promote rooftop photovoltaic facilities with a total capacity of up to 200 MW, of which 100 MW were reserved for industrial production and 100 MW for private buildings. Currently, the FiT is at THB 6.85 (approx. 0.19 €) per kWh and - in theory - available for private rooftop photovoltaic facilities with a capacity of up to 10 kW peak performance. For industrial rooftop facilities with a peak performance of 10 to 250 kWp the FiT is THB 6.40 (approx. 0.17 €). For industrial facilities with peak performance between 250 kW and 1 MW the FiT is THB 6.01 (approx. 0.16 €).[12] Facilities in the Southern border provinces[13] receive an additional bonus of THB 0.50 (approx. 0.014 €) per kWh.

At present, however, Power Purchase Agreementss are the exception rather than the rule. For example, the MEA and PEA only grant Power Purchase Agreements for the feed-in of solar energy from private consumers until the end of 2022 or up to a total installed capacity of max. 5 MW each.

**b) BOI Promotion**

The lack of Power Purchase Agreements has led to a situation where only B2B solutions are used, especially for solar plants, and the producers sell electricity directly to the customers. There is a variety of models regarding financing and ownership structure. Such investments are promoted through the Boards of Investment in Thailand. Manufacturers of solar cells and related raw materials receive 8 years of corporate income tax exemption, capped at the total investment amount, and exemption from import duties on machines and raw materials.[14]

The production of electricity from solar energy receives the same promotion.[15]

[12] Thailand Board of Investment: "Alternative Energies in Thailand, http://www.boi.go.th/upload/content/alt_energy_5a4faa2f9dc0b.pdf

[13] Yala, Pattani, Narathiwat, as well as 4 districts in Songkla province.

[14] Promotion category A2 according to *BOI Announcement No. 2/2557 (2014), List of Activities Eligible for Investment Promotion, Section 5.4.2.* http://www.boi.go.th/upload/content/newpolicy-announcement%20as%20of%2020_3_58_23499.pdf.

[15] Promotion category A2 according to *Section 7.1.1.2.*

The manufacturing of parts and equipment for solar-powered products receives corporate income tax exemption for 5 years, as well as exemption from import duties on machines and raw materials.[16]

**c) Public Private Partnerships**

Apart from the above-mentioned rooftop photovoltaic facilities, special provisions apply to large-scale photovoltaic facilities, so-called solar farms. These regulations announced by the Energy Regulatory Commission of Thailand (**"ERC"**) in 2016 and replaced the previous promotion for solar farms (FiT and Adder Tariff).

The program by the government and the Agricultural Cooperatives Programme ("Agro-Solar") aims at the realization of solar farms with a capacity of up to 5 MW each and a total capacity of 800 MW. in the form of Public Private Partnerships. To receive the FiT of THB 5.40 (approx. 0.15 €) per kWh, a Power Purchase Agreement must be concluded with the Metropolitan Electricity Authority or the Provincial Electricity Authorities, which guarantees the power purchase and the FiT for 25 years. Parties to the Power Purchase Agreement are the respective Electricity Authority and the municipality or other authority that functions as project owner. Each authority or municipality can only own a maximum of one project per district.

Private investors can participate as supporters. Thereto they must be companies registered in Thailand and can participate in more than one project (with a total capacity of 50 MW). During the term of the Power Purchase Agreement, a project transfer is only possible in limited cases and only with the approval by the Office of Energy Regulatory Commission. In practice, this means that the Public-Private-Partnership is committed for 25 years, after which the project may be transferred to one of the partners, as is commonly the case with Build-Operate-Transfer (**"BOT"**) projects.

## 2. Wind Energy

In 2021 the total installed capacity of wind energy in Thailand was 1,500 MW[17], compared to 63,000 MW in Germany as of 2022. The Alternative Energy Development Plan envisages 2,989 MW by 2037.

**a) Feed-in-Tariff**

The FiT for small-scale wind energy producers with a capacity of up to 200 kW is THB 5,76 (approx. 0.16 €) per kWh. Facilities in the Southern border provinces receive an additional bonus of THB 0.50 (approx. 0.014 €) per kWh. However, in the case of wind energy, Power Purchase Agreements are rather the exception.

**b) BOI Promotion**

The electricity production from wind power receives 8 years of corporate income tax exemption capped at the amount of total investment, as well as exemption from import duties on machines and raw materials.[18]

[16] Promotion category A3 according to *Section 5.4.8.*

[17] Statista, "Total wind energy capacity in Thailand from 2012 to 2021".

[18] Promotion category A2 according to *Section 7.1.1.2.*

## 3. Hydropower

In 2021, facilities for producing energy from hydropower with a total capacity of approx. 3,700 MW were installed in Thailand, including large power plants operated by the Electricity Generating Authority of Thailand (**"EGAT"**) with a capacity of approx. 2,900 MW. The Alternative Energy Development Plan envisages a capacity increase of small-scale hydropower up to 3,228 MW by 2037. Expansion of existing large power plants is not planned.

### a) Feed-in-Tariff

The FiT for small-scale producers of energy from hydropower with a capacity of up to 200 kW is THB 4.68 (approx. 0.13 €) per kWh, guaranteed for up to 20 years. Facilities in the Southern border provinces receive an additional bonus of THB 0.50 (approx. 0.014 €) per kWh.

### b) BOI Promotion

Hydropower projects receive 3 years of corporate income tax exemption capped at the amount of total investment, as well as exemption from import duties on machines and raw materials.[19] However, the approval of the Board of Investment incentives regarding to the Hydropower projects still depends on other relevant laws and regulations, and the discretion of competent authorities on a case-by-case basis, e.g., location and Environmental Impact Assessment (**"EIA"**) situation.

## 4. Waste-to-Energy

Currently, 320 MW of commercial energy are produced by waste-to-energy projects. This capacity should be increased to 975 MW by 2037 according to the Power Development Plan and the Alternative Energy Development Plan.

### a) Feed-in-Tariff

The FiT for small-scale producers of waste-to-energy consists of a fixed FiT:
≤ 1 MW: THB 3.03 (approx. 0.084 €)/ kWh
1 - 3 MW: THB 2.52 (approx. 0.07 €)/ kWh
≥ 3 MW: THB 2.31 (approx. 0.064 €)/ kWh.

A variable FiT adjusted to the inflation rate is added (2021):
≤ 1 MW: THB 3.17 (approx. 0.088 €)/ kWh
1 - 3 MW: THB 3.17 (approx. 0.088 €)/ kWh
≥ 3 MW: THB 2.67 (approx. 0.074 €)/ kWh.
Facilities in the Southern border provinces receive an additional bonus of THB 0.50 (approx. 0.014 €)/ kWh.

As in the solar energy sector, Power Purchase Agreements are an exception and mainly B2B-Agreements are offered.

### b) BOI Promotion

Waste-to-energy projects receive 8 years of corporate income tax exemption without being capped at the amount of total investment, as well as exemption from import duties on machines and raw materials.[20]

[19] Promotion category A1 according to *Section 7.1.1.3.*

[20] Promotion category A1 according to *Section 7.1.1.1.*

Production of fuel from agricultural waste receives 8 years of corporate income tax exemption capped at the amount of total investment, as well as exemption from import duties on machines and raw materials.[21]

## 5. Biomass

Currently, approx. 3,000 MW of commercial energy is produced from biomass. This capacity shall be increased to 5,790 MW by 2037 according to the Alternative Energy Development Plan.

### a) Feed-in-Tariff

The FiT for small-scale producers of energy from biomass consists of a fixed FiT:
≤ 1 MW: THB 3.03 (approx. 0.084 €)/ kWh
1 - 3 MW: THB 2.52 (approx. 0.07 €)/ kWh
≥ 3 MW: THB 2.31 (approx. 0.064 €)/ kWh.

A variable FiT adjusted to the inflation rate is added (2021):
≤ 1 MW: THB 2.20 (approx. 0.061 €)/ kWh
1 - 3 MW: THB 2.20 (approx. 0.061 €)/kWh
≥ 3 MW: THB 1.84 (approx. 0.051 €)/ kWh.
Facilities in the Southern border provinces receive an additional bonus of THB 0.50 (approx. 0.014 €)/ kWh.

Power Purchase Agreements for biomass are currently concluded only in exceptional cases; production therefore happens mostly within the framework of B2B solutions.

### b) BOI Promotion

The production of electricity or fuel from biomass receives 8 years of corporate income tax exemption, but capped at the amount of total investment, as well as exemption from import duties on machines and raw materials.[22] The production of biomass briquettes and pellets receives 5 years of corporate income tax exemption capped at the amount of total investment, as well as exemption from import duties on machines and raw materials.[23]

## 6. Biogas

Currently, approx. 360 MW of commercial energy is produced from biogas. This capacity should be increased to 1,565 MW by 2037 according to the Alternative Energy Development Plan.

### a) Feed-in-Tariff

The FiT for producers of biogas from liquid and solid waste is THB 3.60 (approx. 0.01 €) per kWh. The FiT for producers of biogas from energy crops consists of a fixed amount of THB 2.70 (approx. 0.075 €) per kWh and an added variable part at THB 2.52 (approx. 0.07 €). Facilities in Southern border provinces receive an additional bonus of THB 0.50 (approx. 0.014 €) per kWh.

### b) BOI Promotion

Production of electricity from biogas and production of biogas from liquid and solid waste receive 8 years of corporate income tax exemption capped at the amount of total investment, as well as exemption from import duties on machines and raw materials.[24]

---

[21] Promotion category A2 according to *Section 1.16.2.*

[22] Promotion category A2 according to *Section 7.1.1.2. and 1.16.2.*

[23] Promotion category A3 according to *Section 1.16.3.*

[24] Promotion category A2 according to *Section 7.1.1.2.and 1.16.2.*

**V. Outlook**

Renewable energy is currently an important topic in Thai politics, both due to its contribution to global climate protection on one hand and to reduce dependencies on fossil fuels. The legal framework was rapidly developed in 2015, particularly for the Alternative Energy Development Plan that was drafted in early 2015 and fundamentally revised and extended within half a year. Besides the promotion of renewable energy investments, expanding the power grid capacity will be crucial for the success of the current energy policy, especially the Power Development Plan 2018, for which the Electrical Generating Authority of Thailand has allocated a budget of THB 600 billion (approx. 16.5 billion €). Thus, it remains to be seen if Thai government's ambitious goals will be achieved. However, it is obvious that Thailand offers attractive possibilities through investment promotions and incentives, particularly for foreign investors. The Board of Investment promotion remarkably reduces the usual obstacles of the foreign investment law and opens the market especially to medium-sized businesses. From more than 25 years of experience, we know that Board of Investment promotions function quickly and effectively.

## VI. Annex I: BOI-Incentives and Project categories:

| Selected BOI incentives for renewable energy projects | | | | |
|---|---|---|---|---|
| Promotion category | Exemption from corporate income tax and dividend withholding tax | Exemption from import duties on: | | Non-tax incentives* |
| | | Machines | Raw materials for the production of export goods | |
| A1 | 8 years (no cap) | ✓ | ✓ | ✓ |
| A2 | 8 years (cap)** | | | |
| A3 | 5 years (cap) | | | |
| A4 | 4 years (cap) | | | |

* These include, amongst others, the possibility for foreigners to own land and easier employment of foreign experts.
** The amount of granted corporate income tax exemption is capped at the amount of total initial investment excluding the cost of land and working capital.

**A1:** Knowledge-based activities focusing on Research & Development and design to enhance the country's competitiveness.
**A2:** Infrastructure activities for the country's development, activities using advanced technology to create value, with no or very few existing investments in Thailand.
**A3:** High technology activities which are important to the development of the country, with a few investments already existing in Thailand.
**A4:** Activities with lower technology than A1-A3 but which add value to domestic resources and strengthen the supply chain.

| Project Category | | Promotion Category |
|---|---|---|
| Solar | Production of solar cells and/or required raw materials | A2 |
| | Production of electricity from solar power | A2 |
| | Production of parts or equipment for solar-powered products | A3 |
| Wind | Production of electricity from wind power | A2 |
| Hydro | Production of electricity from hydropower | A4 |
| Waste-to-Energy | Production of electricity from waste-to-energy | A1 |
| | Production of fuel from agricultural waste | A2 |
| Biomass | Production of electricity from biomass | A2 |
| | Production of biomass briquettes and pellets | A3 |
| Biogas | Production of electricity from biogas | A2 |
| | Production of biogas from wastewater | A2 |

## VII. Annex II: Feed-in tariffs in Germany and Thailand compared

| | Germany (full feed-in) | Thailand |
|---|---|---|
| Solar energy <10 kW | EUR 0,13/ kWh | BHT 6,85 (ca. EUR 0,19)/ kWh |
| Solar energy <250kW | EUR 0,11/ kWh | BHT 6,4 (ca. EUR 0,18)/ kWh |
| Solar energy <1MW | EUR 0,11/ kWh | BHT 6,01 (ca. EUR 0,17)/ kWh |
| Wind energy | EUR 0,0618/ kWh (onshore small plants <750kW) | BHT 6,06 (ca. EUR 0,17)/ kWh (small plants <10kWh) |

*We hope that the information provided in this newsletter was helpful for you.*
*If you have any further questions please do not hesitate to contact us.*

**LORENZ & PARTNERS Co., Ltd.**
27th Floor Bangkok City Tower
179 South Sathorn Road, Bangkok 10120, Thailand
Tel.: +66 (0) 2-287 1882
Email: info@lorenz-partners.com

www.lorenz-partners.com