Overview of energy sector projects in Croatia
HEP (national utility company) and the Republic of Croatia significantly depend on imported electricity and the hydrological conditions.

**HEP Mission:** *Safe and high-quality supply of energy, with a high degree of social responsibility.*

Electric Energy sources - 2011

- **Hydro:** 25%
- **Thermal:** 28%
- **Nuclear:** 16%
- **Import:** 32%*

* The average share of imports in the last 5 years was 26%

- Croatia imports almost 30% of electricity and 75% of primary energy.
- Hydropower makes for almost 30% of the electricity balance: low cost but highly dependent on hydrological conditions.

Total of 5,800 MW new capacity planned

- Reduce dependence on imports
- Strengthen and develop electricity generation industry
- Macroeconomic effects of investing
Projects in construction and development have cumulative capacity of 5.800 MW

<table>
<thead>
<tr>
<th>Project</th>
<th>MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPP Sisak</td>
<td>230</td>
</tr>
<tr>
<td>TPP Plomin C</td>
<td>500</td>
</tr>
</tbody>
</table>

**TOTAL MW = 5,800**

<table>
<thead>
<tr>
<th>Project</th>
<th>MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kosinj/Senj II</td>
<td>412</td>
</tr>
<tr>
<td>ZG on Sava</td>
<td>120</td>
</tr>
<tr>
<td>Dubrovnik II</td>
<td>300</td>
</tr>
<tr>
<td>TE-TO Osijek</td>
<td>500</td>
</tr>
<tr>
<td>TPP Rijeka</td>
<td>600</td>
</tr>
<tr>
<td>EL-TO Zagreb</td>
<td>140</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project</th>
<th>MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPP Vukovar</td>
<td>400</td>
</tr>
<tr>
<td>TPP Peruća</td>
<td>400</td>
</tr>
<tr>
<td>TPP Slavonski Brod</td>
<td>500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project</th>
<th>MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL MW</td>
<td>1,655</td>
</tr>
</tbody>
</table>
TPP Sisak C

<table>
<thead>
<tr>
<th>Project overview</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project owner</strong></td>
</tr>
<tr>
<td>• HEP Proizvodnja d.o.o. (part of HEP group)</td>
</tr>
<tr>
<td><strong>Key data</strong></td>
</tr>
<tr>
<td>• Installed capacity:</td>
</tr>
<tr>
<td>o Electric: 230 MW</td>
</tr>
<tr>
<td>o Thermal: 50 MW</td>
</tr>
<tr>
<td>• Anticipated annual production</td>
</tr>
<tr>
<td>o Electric 1500 GWh</td>
</tr>
<tr>
<td>o Thermal 140 GWh</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Status and outlook</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Progress summary:</strong></td>
</tr>
<tr>
<td>• General contractors: Technopromexport, Monting PIM and INGRAD</td>
</tr>
<tr>
<td>• Trial runs planned to start at the end of 2013, commercial operation from February 2014.</td>
</tr>
<tr>
<td>• Financing through compensation with Russia</td>
</tr>
<tr>
<td>• Location on an infrastructural good position + close to the center of a large consumption center – Zagreb</td>
</tr>
<tr>
<td><strong>Status:</strong></td>
</tr>
<tr>
<td>• Under construction (approximately 95% completed)</td>
</tr>
<tr>
<td>• Sufficient gas quantities still to be secured for the operation of the plant</td>
</tr>
</tbody>
</table>

**Total investment:** 224,6 mil. EUR

**Implementation schedule:** construction started 2008, expected commissioning 04/2014
TPP Plomin C - 500

Project overview

Project coordinator
• HEP d.d.

Key data
• Installed capacity 500 MW
• Anticipated annual production 3600 GWh
• Investment value exceeds 800 mil. EUR
• Construction planned to start Q4/2014
• Commissioning planned for Q3/2018

Status and outlook

• Tender for a strategic partner is in progress. Binding bids expected October 2013
• 50-50% joint venture with strategic partner (SP), which will be responsible for providing an EPC construction, financing, coal supply and marketing 50% of the electricity (50% will be taken over by HEP with a long-term PPA contract)
• The project is a “replacement” project for Plomin I, which also runs on coal
• Plomin II until 2015 in co-ownership with RWE (50%)
• New capacity with high efficiency - 45%
• Expected NOx and SO2 emissions lower than Plomin I

Total investment: 800+ mil. EUR

Implementation schedule: expected start Q2/2014, commissioning 06/2018
## Project overview

**Key data**
- Installed capacity
  - Electrical: 500 MW
  - Thermal: 160 MW
- Anticipated annual production 3.600 GWh
- Construction planned to start in 2014
- Commissioning planned for 02/2017

## Status and outlook

- Combined-cycle cogeneration gas unit to replace old CCGT
- In Slavonia missing approximately 400 MW of capacity.
- Documentation package (BD, FS, EIA) contracted with IGH + APA + EF Osijek. BD by 10/13, EIA by 10/13.
- Feasibility study finished.
- Purchase of land in progress
- Good infrastructure at the site, the possibility of cogeneration for district heating,
- Decision to be made on financing and the business model

### Total investment: 350 mil. EUR

**Implementation schedule:** ongoing preparations, commissioning by early 2017
### Project overview

#### Key data
- Installed new capacity 412 MW
- Anticipated annual production 345 GWh

### Status and outlook

- Environmental impact study and main impact assessment is in progress,
- Project is integrated in spatial plans
- Project includes refurbishment of existing HE Sklope (27MW) and Senj 1 (216 MW), construction of reservoirs Kosinj and Gusić; construction of new HPP Kosinj (52MW) and Senj 2 (360 MW)
- The system will generate a total of approximately 1600 GWh (345 GWh new peak energy and 782 GWh of existing base energy becomes peak)
- Will be used for flood control of Kosinjsko field, improving water supply to a part of the Primorje region (Karlobag-Pag)

**Total investment: 650 mil. EUR**

**Implementation schedule: expected start Q2/2014, comissioning Q4/2019**
Hydro power plant (HPP) Dubrovnik 2

<table>
<thead>
<tr>
<th>Project overview</th>
<th>Status and outlook</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key data</strong></td>
<td>• MoU signed with ERS (Elektroprivreda Republike Srpske) on joint project development (first step is development of a feasibility study)</td>
</tr>
<tr>
<td>• Installed capacity 300 MW</td>
<td>• HPP Dubrovnik 1 and 2 use water accumulation Bileća (located BiH, owner ERS)</td>
</tr>
<tr>
<td>• Anticipated annual production 318 GWh</td>
<td>• HEP awaiting agreement with ERS (owner of Bileća accumulation) on joint financing, construction and management and regarding disagreements over distribution ratios of electricity from HPP Dubrovnik 1) before committing to investment</td>
</tr>
<tr>
<td>• Investment value 174 mil. EUR</td>
<td>• Total power after commissioning of HPP Dubrovnik 2 on location is 520 MW</td>
</tr>
<tr>
<td>• 50% HEP participation in investment and capacity allocation</td>
<td></td>
</tr>
<tr>
<td>• Construction planned to start in 2014</td>
<td></td>
</tr>
<tr>
<td>• Commissioning planned for Q4/2018</td>
<td></td>
</tr>
</tbody>
</table>

Total investment: 174 mil. EUR
Implementation schedule: ongoing preparations, commissioning by late 2018
Hydroelectric system „Zagreb on Sava”

Project overview

- **Project owner**
  - Razvoj višenamjenskih nekretninskih objekata, d.o.o., HEP group member

- **Key data**
  - Installed capacity of 120 MW
  - A series of 4-6 run-of-river HPPs on Sava producing 600 GWh (23% of annual consumption for city of Zagreb)
  - Investment value 492 mil. EUR (energy)
  - Construction planned to start in 2016
  - Commissioning planned for 2021

Status and outlook

- **Study on optimal technical solution in progress, results Q2/2013**
  - Confirmed possible 120 MW, additional 500 MW of pumped-storage HPP being evaluated

- **Multipurpose project of using the river Sava from the Slovenian border to Sisak**
  - Multiple interested parties (Croatian Waters, City of Zagreb, Zagreb county, private real estate developers)
  - Enabling urban development, transportation (bridges) and recreation facilities on 360 hectares

- **Construction of the navigation channel Sava-Sava, river port Zagreb in Velika Gorica**

- **Creates flood protection for city of Zagreb and increases security of water supply**

Total investment: 492 mil. EUR (energy components only), 1.2 bil. EUR expected total
Implementation schedule: expected start 2016, commissioning possible in 2021
Croatia currently realised 14% of its 1655 MW RES goals by 2020.

Overview of implemented renewable energy sources (RES) in comparison with the Energy Strategy of Croatia:

- **Target total RES by 2020, according to the Energy Strategy**: 1,655 MW
- **RES connected to the grid**: 226 MW (Wind power plants (WPP) currently main contribution)
- **RES projects being realized**: 288 MW
- **Potential RES remaining until fulfillment of goals from Energy Strategy**: 1,141 MW (Connection of a large number of new solar power plants and biomass plants is expected, along with new WPP)

Current realization of RES projects represents 13.8% and projects in progress an additional 17.4% of the total goal set in the Energy Strategy.
Recieving LNG terminal in Omišalj – gateway to central and eastern Europe

**Project development overview**

- Construction of onshore* receiving LNG terminal with initial capacity of 5 bcm
- Feasibility study expected in October 2013
- ESIA completed, approval by the Ministry of environmental protection expected by the end 2013
- Excellent position with proximity to significant gas and electricity consumption, developed infrastructure
- Maritime characteristics are favorable
- Enhancing gas market, diversification of supply sources, increasing security of supply

**Planned terminal capacity:** 6 bcm/year
**Total investment:** 630 mln €
**Expected start of construction:** 2014-2015
**Size of supply ships:** 75,000 – 265,000 m³

*Includes LNG storage and regasification facilities.*
**Ionic-Adriatic pipeline (IAP)**

**Overview**
- Creating a new supply line for transit of gas to south and central Europe from Casipan region (primarily Croatia, BiH, Albania)
- Creating a connection to the Trans-Adriatic pipeline (TAP) project

**Status and outlook**

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>TAP selection by Shah Deniz consortium will enable implementation of IAP</td>
</tr>
<tr>
<td>Approved financing of 3,5 mil. EUR from WBIF for developing a feasibility study (exp. finish 12/2013)</td>
</tr>
</tbody>
</table>

**Cost components (total 600 mil. EUR)**
- Croatia: 250 km (300 mil. EUR)
- Montenegro: 110 km (120 mil. EUR)
- Albania: 180 km (180 mil. EUR)

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**Total investment: 600 mil. EUR**

**Implementation schedule: to be determined by WBIF feasibility study**
New legal framework for exploitation and exploration of hydrocarbons is being adopted in Croatia

- Optimize management of mineral resources
- Increase competition in hydrocarbons exploration and exploitation
- Increase the level of investment protection
- Adopt international legal best practices

Law on mining
Law on exploration and exploitation of hydrocarbons

Law is based on best practices from countries with extensive and successful experience with hydrocarbons exploration:
- Tunisia, Egypt, Lybia, Syria, Albania, Russian Federation, Georgia, Kazahstan, Turkmenistan

The law is also based on EU positions regarding foreign investments.