

# Estimating WACC rates for different energy investment projects and different countries

Presentation, Zelya January 2009



Zelya Energy

## **N.B.**

Data and results shown in this presentation have been gathered in 2007 – 2008, during previous works performed by Zelya Energy.

Key information (regarding WACC parameters' value) has been extracted from these studies, and then processed in order to illustrate how much WACC rates were likely to vary from one country to another, in function of the nature of the activity and the regulatory environment.

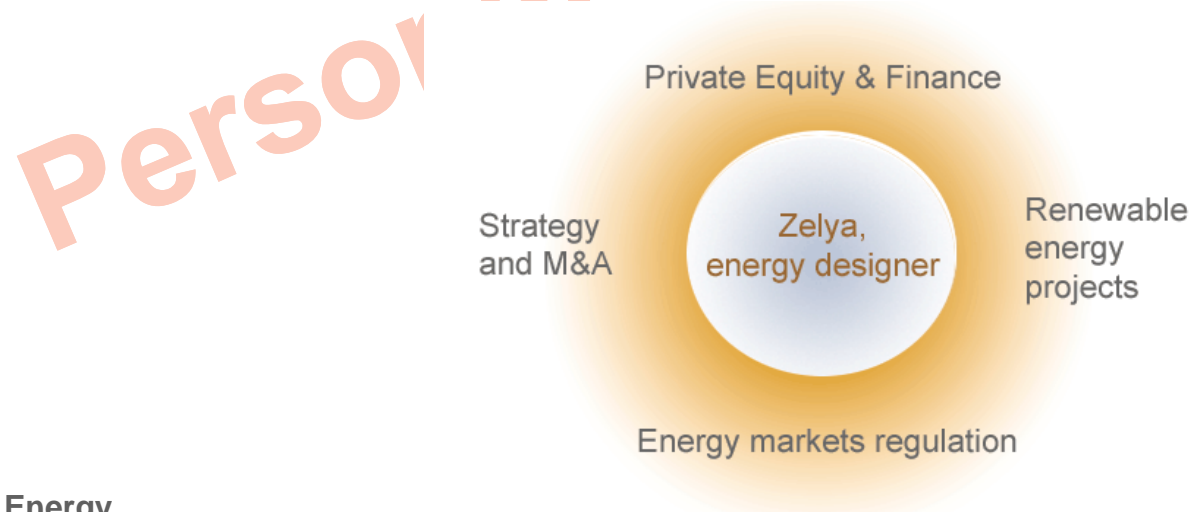


- Zelya Energy is an independent consulting firm, specialized in the energy sector, whose mission is to help industrial and financial players in their **investment** and **development strategies**
- Our firm relies on:
  - the regulatory, technical and financial skills of its consultants...
  - ... to offer a high-quality service to energy suppliers and producers, and
  - banks and private equity firms, as well as administrations and public authorities in charge of market regulation
- We've chosen to follow you in this complex market providing you with concrete support and specific solutions.



We offer our clients a double expertise:

- **An expertise of the energy sector, particularly regarding regulatory issues:** rules and access conditions to power and gas transmission & distribution networks, laws and regulatory framework governing energy production, shipping and trading...
- An expertise regarding **Strategy and Investments in the gas and power markets**
  - Financial evaluation,
  - Due diligences/analyses of companies and energy projects,
  - Assistance to energy infrastructure developers,
  - Growth and entry strategies on energy markets...



Core business and main activities of Zelya Energy:

- **Regulatory advisory and assistance** for the dvpt/acquisition of power plants and gas/power infrastructures:

- Expertise in tariff design and access rules to gas and electricity networks and infrastructures;
- Expertise in renewable markets and incentives frameworks in favor of renewable energy;
- Rules and process relative to power plant development (CCGT, wind farms, photovoltaic power plants...);
- Market studies.



- **Business Valuation and Investment Advisory Services:**

- Due diligence
- Business plan, financial modeling and business valuation
- WACC calculation and methodology



- **Main clients of Zelya Energy:**

- Investment firms & Banks
- Energy groups
- Administrations and governmental bodies (the French energy regulator, local governmental bodies...)

# Content

---

- **Introduction to the cost of capital**
  - Weighted Average Cost of Capital
  - Systematic risk
  - WACC/CAPM formula
  - First key principles
  - Weight of main parameters
  
- Common parameters
  
- Activity specific parameters
  
- Local market conditions
  
- Conclusion

## Introduction to the cost of capital: WACC

- To fund its business, a company uses different components of financing: essentially debt and equity
- For the company, the cost of these financial resources is the weighted average of:
  - the cost of debt
  - the cost of equity
$$\text{WACC} = g \cdot \text{Cost of debt} + (1-g) \cdot \text{Cost of equity}$$

where gearing  $g = \text{Debt}/(\text{Debt} + \text{Equity})$ , financial leverage usually calculated with market values rather than book values
- **Cost of debt  $\approx$  Interest paid by the firm on bank loans, bonds**
  - Since they are tax deductible, the post-tax cost of debt is multiplied by  $(1 - \text{tax rate})$
- **Cost of equity is more complex**
  - Companies do not commit themselves to paying a certain level of dividends
  - Share prices can fall as well as go up

**Because payments are not contractually defined and because equity investors receive payments only after debt payments have been made, companies need to reward them for bearing a higher level of risk**

⇒ **Equity finance is more expensive**

## Introduction to the cost of capital: **Systematic risk**

---

Page 8 to 13  
available in original document

Personal – ZELYA Sample



## Introduction to the cost of capital: Weight of main parameters

- The relative importance of each main WACC parameter can be appraised through a **simple reference base case**
  - Common parameters: risk free rate  $R_f = 3,5\%$ , equity market risk premium  $EMRP = 8\%$ ,
  - **Beta = 1**, Financial gearing  $g = D/(D+E) = 50\%$  and debt margin  $d = 2\%$
  - Tax rate  $t = 30\%$
- **WACC** =  $(1-g).(R_f + \beta.EMRP) + g.(1-t).(R_f + d) = \underline{7,7\%}$ 
  - Cost of equity = 11,5%
  - Pre-tax cost of debt = 5,5%, post-tax cost of debt = 3,85%
- **Impact on WACC rate:**
  - $R_f$  : **+ 0.85.g** → WACC increases with  $R_f$  by a 0.85 factor
  - EMRP: **+ EMRP/2** → an EMRP of 6% instead of 8% reduces the WACC rate by 1%
  - Equity Beta: **+ 4 $\beta$**  → a difference in beta of 0.25 has also a  $\pm 1\%$  WACC impact
  - Gearing: **- 7,65.g** → a 10% decrease in  $g$  has exactly the reverse effect on WACC  
 $\pm 1\%$  WACC impact would need a difference in  $g$  of  $\pm 13\%$
  - Debt margin: **+0,35.d** → The “smallest” parameter

→ **These activity-specific parameters are actually interrelated:  $\beta \leftrightarrow g, g \rightarrow d$**

## Content

---

- Introduction to the cost of capital
- **Common parameters**
  - Risk free rate
  - Equity market risk premium
- Activity specific parameters
- Local market conditions
- Conclusion

Personal – ZELYA Sample

## Common parameters: Risk free rate

$$WACC = (1-g) \cdot (R_f + \beta \cdot EMRP) + g \cdot (1-t) \cdot (R_f + d) \quad \text{Impact: } +0,85 \cdot R_f$$

- **Risk free asset:** (zero coupon) **German Eurobond**
  - Yield spreads between German, French, and Dutch bonds used to be marginal. **Current fly-to-quality movements affects also Eurozone's core** with spreads of ten-year government bonds vis-à-vis their German counterparts as high as 50/70 basis points (+130 bp for Italy, +250bp for Greece)
- **Choice of a maturity that best matches the entire cash flow stream (cf. 1<sup>st</sup> principle) → beware the discrepancies between investments being valued!**
  - Typically 10-year bund →  $R_f = 3,30\%$  vs.  $2,50\%$  for the 5-year bund
  - Remark: some regulators (such as Denmark) take a questionable approach with a maturity that matches the regulatory period
- **Corporate finance practitioners typically apply prevailing yields to maturity (YTM). Given current financial market conditions, our recommendation is to smooth them as regulators do (but not too much) and consider future rates as well**
  - Averaging YTM for too long a period may mistakenly assume a quick return to “normal”
  - For the same reason, long term historical YTM adjusted to current inflation rate used by some regulators are now less appropriate

## Common parameters: Equity market risk premium

i/

$$\text{WACC} = (1-g).(R_f + \beta \cdot \text{EMRP}) + g.(1-t)(R_f + d) \quad \text{Impact: } +0,5 \cdot \text{EMRP}$$

Pages 17 to 21 not available

Personal – ZELYA Sample

# Asset beta: results from 2007 WACC study

ii/

$$WACC = (1-g).(Rf+\beta.EMRP)+g.(1-t)(Rf+d)$$

Impact:  $+4.\beta_e$   
with asset beta Impact:  $+8.\beta_a$

- Impact on the WACC rates (compared to 7,7%):

| Gas Transport & LNG in different countries |       |       |         |
|--|-------|-------|---------|
|  | Spain | Italy | Belgium |
| Asset beta                                 | 0,57  | 0,34  | 0,28    |
| Wacc rate                                  | 8,2%  | 6,4%  | 5,9%    |

| Electricity T&D in different countries |      |       |         |
|--|------|-------|---------|
|  | UK   | Italy | Belgium |
| Asset beta                             | 0,40 | 0,34  | 0,11    |
| Wacc rate                              | 6,9% | 6,4%  | 4,6%    |

Different countries, same (regulated) activity

Different activities, same country

Regulated & Unreg. activities in UK

|            | Production | Integrated | Regulated |
|------------|------------|------------|-----------|
| Asset beta | 0,85       | 0,63       | 0,40      |
| Wacc rate  | 10,5%      | 8,7%       | 6,9%      |

- Remark: in this basic example, only asset betas changes. In reality, asset betas and gearing are not independent variables: they tend to be negatively correlated

## Content

---

- Introduction to the cost of capital
- Common parameters
- Activity specific parameters
- **Local market conditions**
- Conclusion

Personal – ZELYA Sample

## Local market conditions

---

- **Even carefully implemented (and updated), benchmark approaches are not enough to assess project-specific WACC parameters. They implicitly assume that same activities in different countries face same market conditions. They do not!**
  - Remark: listed companies' betas depend also on other factors such as confidence in the management, information asymmetry, etc. But these issues are not (or less) relevant for intra-group projects valuations
- **Within a same activity, local exposure to systematic and specific risks differs from one country to another. Adjustments should be carried out at the relevant WACC or cash-flow level, or in a consistent manner along projects valuations ,if both approaches are acceptable**
  - Adjustments in addition to those related to tax and currency exchange rates issues
  - Cash-flow level: probability weighted scenarios through risks assessment
- **Regulated vs. non regulated activity: generally, their perimeters for energy infrastructure are the same in Europe but the type regulation differ. So do cash-flows sensitivities to variations of general economic conditions.**
  - In the renewable energy generation business, for instance, revenues are regulated in a very different manner across Europe

Pages 30-38 available in original document

Personal – ZELYA Sample





**Dank u!**

**Contact:**

*Florie Mazzorana*  
[florie@zelya.com](mailto:florie@zelya.com)

*Aurélie Péchou*  
[aurelie@zelya.com](mailto:aurelie@zelya.com)

*Office number: +33 1 34 29 59 27*