

## CROSS-LINGUAL QUERYING AND COMPARASION OF LINKED FINANCIAL AND BUSINESS DATA: A BUSINESS REGISTER USE CASE

SEÁN O'RIAIN, NUIG

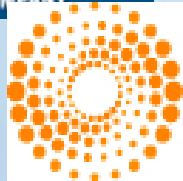
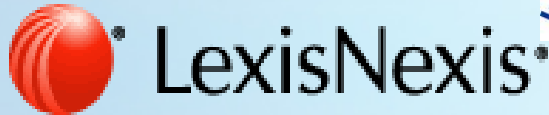
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# FINANCIAL DATA LANDSCAPE

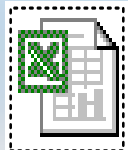


THOMSON REUTERS



THE WORLD BANK

CrunchBase



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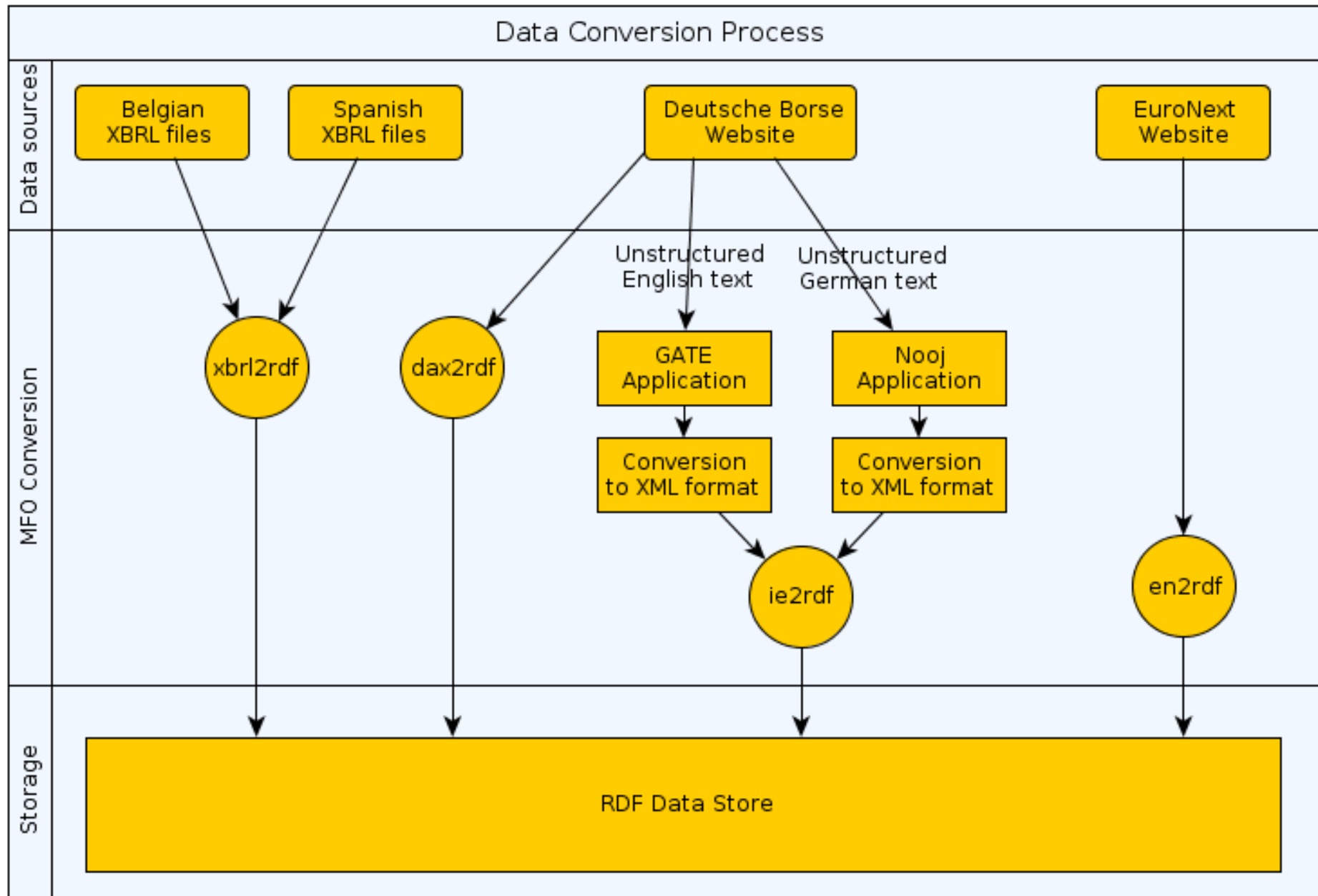
# BUSINESS PROBLEM LANDSCAPE

- Big Data Problem
  - Lack of XBRL/GAAP taxonomy alignment, language
- Improved search and query capability across:
  - XBRL taxonomies / jurisdictions
  - Integrated XBRL and non-XBRL data
- Comparability of business data:
  - Filings level
  - Company level

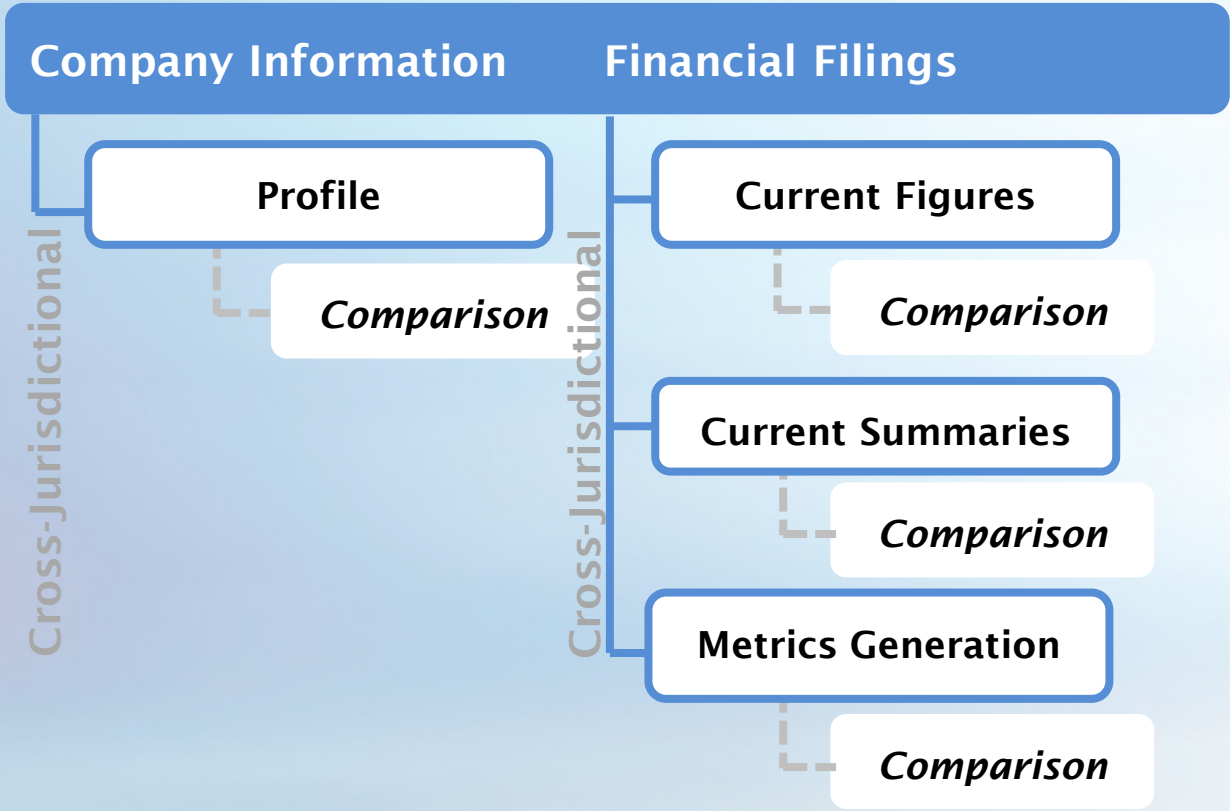
# SOLUTION APPROACH

- Improved multilingual access to XBRL data, e.g., multi-company analysis and cross-taxonomy queries
- Improved search and query capability based on linking XBRL with related non-XBRL financial and business data
- Comparability of XBRL financial and non-XBRL business data using ontologies and IE

# MFO AS INTEGRATION INFRASTRUCTURE



# DEMO ARCHITECTURE LAYOUT





# BUSINESS & FINANCIAL DATA QUERYING



English ▾

## Select Companies

26 companies found (2 already selected)

5 filings	<b>Enfinity</b> Identifier: BE0883070875 Alternative Names: Enfinity NV / Enfinity Management
4 filings	<b>Green Energy 4 Seasons</b> Identifier: BE0897430241 Alternative Names: Green Energy 4 Seasons
6 filings	<b>Kabelwerk Eupen A.G.</b> Identifier: BE0437768918 Alternative Names: Kabelwerk Eupen - Câblerie d'Eupen - Kabelfabriek Eupen
5 filings	<b>Tractebel Engineering</b> Identifier: BE0412639681 Alternative Names: Tractebel Engineering (anciennement TRACTEBEL ENGINEERING INTERNATIONAL) / TRACTEBEL ENGINEERING (anciennement TRACTEBEL ENGINEERING INTERNATIONAL)

4 companies selected

[Clear search filters](#) [Find Companies](#)

EDP RENOVAVEIS  4EnergyInvest  Deutsche Telekom  TRIPLAN AG

## Select Date Range

From  To

Submit

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# CROSS-LINGUAL QUERYING & COMPARASION (EN)

■ 4EnergyInvest 
 ■ Electrabel 
 ■ EDP RENOVAVEIS 
 ■ Deutsche Telekom 
 ■ TRIPLAN AG

[Financial Filings](#)
[Financial Metrics](#)
[Company Profiles](#)

	EDP RENOVAVEIS	4EnergyInvest	Deutsche Telekom	Deuts
	Euronext - 2013-03-08 15:34 ▼	Euronext - 2013-03-08 15:34 ▼	Deutsche Börse - 2013-03-08 15:33 ▼	Deuts
Company Name	EDP RENOVAVEIS	4ENERGY INV (D)	<a href="#">Deutsche Telekom</a> Deutsche Telekom AG	TRIPLA TRIPLA
Stock Exchange	Euronext	Euronext	Deutsche Börse	Deutsc
Symbol	EDPR	ENIN	DTE	TPN
Source	<a href="https://europeanequities.nyx.com">https://europeanequities.nyx.com</a>	<a href="https://europeanequities.nyx.com">https://europeanequities.nyx.com</a>	<a href="http://www.boerse-frankfurt.de">http://www.boerse-frankfurt.de</a>	<a href="http://v">http://v</a>
Street	calle Serrano Galvache 56 Centro Empresarial Parque 4º floor	Paepsem Business Park boulevard des Paepsemiaan 20	Friedrich Ebert Allee 140	Auf der
City	28033 Madrid	BE-1070 Bruxelles	53113 Bonn	65812
Country	Spain	Belgium	Germany	Germa
Customers				
E-mail			investor.relations@telekom.de	info@t
Employees				
Fax				
ISIN	ES0127797019			+49 (0)
Location				DE000
Phone				Bad S
Revenue				+49 (0)
Sector	<a href="#">(2733) Electrical Components &amp; Equipment</a> <a href="#">(7537) Alternative Electricity</a>	<a href="#">(2733) Electrical Components &amp; Equipment</a> <a href="#">(7537) Alternative Electricity</a>	<a href="#">(6535) Fixed Line Telecommunications</a> <a href="#">(6535) Fixed Line Telecommunications</a>	<a href="#">(4570)</a> <a href="#">(1357)</a> <a href="#">(2357)</a>
Website			<a href="http://www.telekom.com">http://www.telekom.com</a>	<a href="http://v">http://v</a>
Accounting Standard			IFRS	IFRS
Admission Date			1996-11-18	2001-0

EDP Renováveis specializes in **electricity production** from renewable energies. The group's activity is organized around 3 areas:

- development and construction of **electricity production units**;
- **electricity production**: from wind energy (16,800 GWh produced in 2011) and hydraulic energy;
- operation and maintenance of electrical plants.

At the end of 2011, EDP Renováveis had an installed capacity of 7,484 MW.



# CROSS-LINGUAL QUERYING & COMPARASION (DE)



Ausgewählt

■ EDP RENOVAVEIS 
 ■ 4EnergyInvest 
 ■ Deutsche Telekom 
 ■ TRIPLAN AG

Finanziellen Filings

Finanziellen Kennziffern

Gesellschaft Profile

	EDP RENOVAVEIS	4EnergyInvest	Deutsche Telekom
	Euronext - 2013-03-08 15:34 ▾	Euronext - 2013-03-08 15:34 ▾	Deutsche Börse - 2013-03-08 15:34 ▾
<b>Unternehmen Name</b>	EDP RENOVAVEIS	4ENERGY INV (D)	<a href="#">Deutsche Telekom</a> Deutsche Telekom AG
<b>Aus Exchange</b>	Euronext	Euronext	Deutsche Börse
<b>Symbol</b>	EDPR	ENIN	DTE
<b>Quellen</b>			<a href="http://www.boerse-frankfurt.de">http://www.boerse-frankfurt.de</a>
<b>Auf der Straße</b>	calle Serrano Galvache 56 Centro Empresarial Parque 4º floor	Paepsem Business Park boulevard des Paepsem laan 20	Friedrich Ebert Allee 140
<b>Stadt</b>			53113 Bonn
<b>Land</b>	Spanien	Belgien	Deutschland
<b>Kunden</b>			<a href="#">business_corporate</a>
<b>E-Mail</b>			investor.relations@telekom.de
<b>Personal</b>			230000
<b>Fax</b>			+49 (0)228 181-88899
<b>ISIN</b>	ES0127797019	BE0003888089	DE0005557508
<b>Standort</b>			
<b>Telefon</b>			+49 (0)228 181-88880
<b>Einnahmen</b>			€58.700.000.000 (2011)
<b>Sektor</b>	<a href="#">(2733) Elektrische Bauteile und Ausrüstungselemente</a> <a href="#">(7537) Alternative Stromerzeugung</a>	<a href="#">(2733) Elektrische Bauteile und Ausrüstungselemente</a> <a href="#">(7537) Alternative Stromerzeugung</a>	<a href="#">(6535) Festnetz-Telekommunikation</a> <a href="#">(6535) Festnetz-Telekommunikation</a>
<b>Website</b>			<a href="http://www.telekom.com">http://www.telekom.com</a>
<b>Rechnungslegungsart</b>			IERS

# FINANCIAL CROSS-JURISDICTION COMPARASION – XEBR (GENERAL)

■ EDP RENOVAVEIS 
 ■ 4EnergyInvest 
 ■ Deutsche Telekom 
 ■ TRIPLAN AG

Financial Filings

Financial Metrics

Company Profiles

Company		2012-12-31	2011-12-31	2010-12-31	2009-12-31
<b>■ Assets</b>					
<a href="#">Assets</a>	EDP RENOVAVEIS	€9,199,790,000	€9,166,293,000	€8,814,938,000	€7,889,281,000
	4EnergyInvest		€19,284,612	€31,389,918	€31,074,113
<b>□ Fixed assets</b>					
<a href="#">Fixed assets</a>	EDP RENOVAVEIS	€8,388,978,000	€8,497,076,000	€8,141,723,000	€7,388,880,000
	4EnergyInvest		€13,196,884	€14,901,643	€14,797,864
<b>□ Intangible fixed assets</b>					
<a href="#">Intangible fixed assets</a>	4EnergyInvest		€143,801	€68,602	€9,926
<b>□ Tangible fixed assets</b>					
<a href="#">Tangible fixed assets</a>	EDP RENOVAVEIS	€1,628,000	€10,454,621,000	€9,981,771,000	€527,000
	4EnergyInvest		€60,805	€221,353	€175,575
<a href="#">Other tangible fixed assets</a>	4EnergyInvest		€27,771	€32,761	€37,750
<b>□ Property, plant, and equipment</b>					
<a href="#">Furniture, fixtures, and equipment</a>	4EnergyInvest		€33,034	€48,661	€54,039
<b>□ Financial fixed assets</b>					
<a href="#">Other financial assets</a>	EDP RENOVAVEIS	€224,000	€9,619,000	€18,380,000	€117,000
	4EnergyInvest		€3,422	€3,422	€4,097
<a href="#">Financial fixed assets</a>	4EnergyInvest		€12,992,278	€14,611,688	€14,612,363
<a href="#">Affiliated enterprises</a>	EDP RENOVAVEIS	€8,367,504,000	€8,490,224,000	€8,126,176,000	€7,382,998,000
	4EnergyInvest		€12,988,856	€14,608,266	€14,608,266
<b>□ Current assets</b>					
<a href="#">Current assets</a>	EDP RENOVAVEIS	€810,812,000	€669,217,000	€673,215,000	€500,401,000
	4EnergyInvest		€6,087,728	€16,488,275	€16,276,249
<b>□ Amounts receivable</b>					
<a href="#">Amounts receivable within one year</a>	4EnergyInvest		€5,959,225	€6,716,068	€5,331,651
<a href="#">Amounts receivable</a>	EDP RENOVAVEIS	€2,842,000	€646,668,000	€776,959,000	€3,294,000
<a href="#">Amounts receivable after more than one year</a>	4EnergyInvest			€9,475,000	€9,475,000
<b>□ Liquid assets</b>					
<a href="#">Liquid assets</a>	EDP RENOVAVEIS	€541,000	€219,922,000	€423,700,000	€257,552,000
<b>□ Deferred charges and accrued income</b>					
<a href="#">Deferred charges and accrued income</a>	4EnergyInvest		€54,432	€198,520	€1,359,103
<b>■ Income statement</b>					

# FINANCIAL CROSS-JURISDICTIONAL COMPARASION – XEBR (CONCEPT)

<a href="#">Intangible fixed assets</a>	4EnergyInvest		€143,801	€68,602	€9,926
<input type="checkbox"/> <b>Tangible fixed assets</b>					
<a href="#">Tangible fixed assets</a>	EDP RENOVAVEIS	€1,628,000	€10,454,621,000	€9,981,771,000	€527,000
	4EnergyInvest		€60,805	€221,353	€175,575
<a href="#">Other tangible fixed assets</a>	4EnergyInvest		€27,771	€32,761	€37,750
<input type="checkbox"/> <b>Property, plant, and equipment</b>					
<a href="#">Furniture, fixtures, and equipment</a>	4EnergyInvest		€33,034	€48,661	€54,039
<input type="checkbox"/> <b>Financial fixed assets</b>					
<a href="#">Other financial assets</a>	EDP RENOVAVEIS	€224,000	€9,619,000	€18,380,000	€117,000
	4EnergyInvest		€3,422	€3,422	€4,097
<a href="#">Financial fixed assets</a>	4EnergyInvest		€12,992,278	€14,611,688	€14,612,363
<a href="#">Affiliated enterprises</a>	EDP RENOVAVEIS	€8,367,504,000	€8,490,224,000	€8,126,176,000	€7,382,998,000
	4EnergyInvest		€12,988,856	€14,608,266	€14,608,266

- Current assets**
- [Current assets](#)
- Amounts receivable**
- [Amounts receivable within one year](#)
- [Amounts receivable](#)
- [Amounts receivable after more than one year](#)
- Liquid assets**
- [Liquid assets](#)
- Deferred charges and accrued income**
- [Deferred charges and accrued income](#)
- Income statement**
- [Income taxes](#)
- [Profit \(loss\) for the period](#)
- Net operating income**



	EDP RENOVAVEIS	4EnergyInvest
2012-12-31	€50,838,000	€-11,899,155
2011-12-31	€59,018,000	€72,521
2010-12-31	€83,038,000	€508,227
2009-12-31	€68,012,000	€-1,593,721
2008-12-31	€112,218,000	€-302,311
2007-12-31	€0	€-146,902
2006-12-31		

# FINANCIAL CROSS-JURISDICTIONAL COMPARASION – METRICS (ALL)



EDP RENOVAVEIS 
  4EnergyInvest 
  Deutsche Telekom 
  TRIPLAN AG

Financial Filings

**Financial Metrics**

Company Profiles

	Company	2012-12-31	2011-12-31	2010-12-31	2009-12-31
<a href="#">Current Ratio ( Measurement of Liquidity)</a>	4EnergyInvest		9.10	21.96	3
<a href="#">Earnings before interest, taxes, depreciation and amortization (EBIT)</a>	4EnergyInvest		€-858,200	€-1,068,346	€-1,098,
<a href="#">Net Result</a>	EDP RENOVAVEIS	€50,838,000	€59,018,000	€83,038,000	€68,012,
	4EnergyInvest		€-11,899,155	€72,521	€508,
<a href="#">Net Working Capital</a>	4EnergyInvest		€5,418,387	€15,737,484	€15,816,
<a href="#">Own Funds</a>	EDP RENOVAVEIS	€5,852,219,000	€5,801,381,000	€5,742,363,000	€5,698,272,
	4EnergyInvest		€18,598,559	€30,497,714	€30,425,

# FINANCIAL CROSS-JURISDICTIONAL COMPARASION – METRICS (SELECTED)



■ EDP RENOVAVEIS 
 ■ 4EnergyInvest 
 ■ Deutsche Telekom 
 ■ TRIPLAN AG

Financial Filings

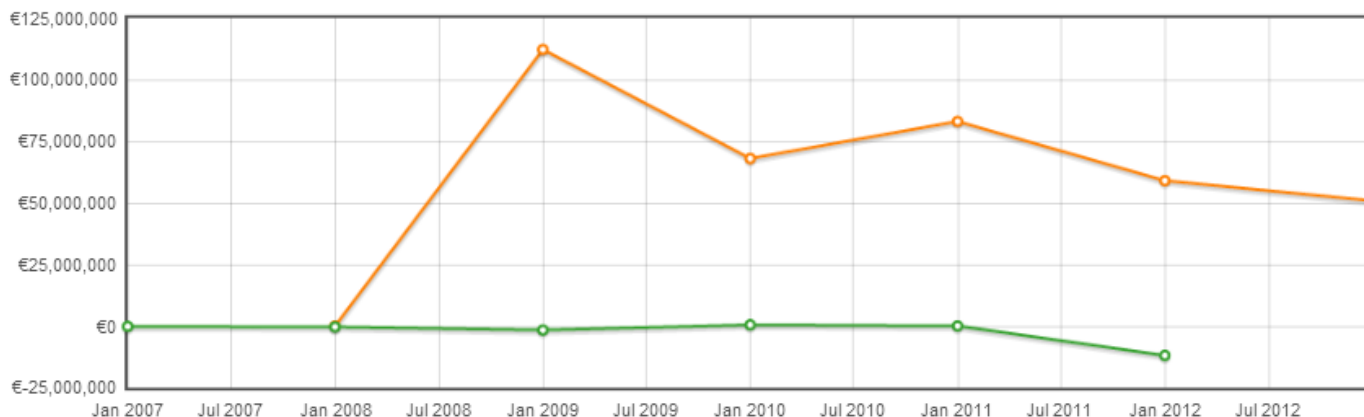
**Financial Metrics**

Company Profiles

	Company	2012-12-31	2011-12-31	2010-12-31	2009-12-31
<a href="#">Current Ratio ( Measurement of Liquidity)</a>	4EnergyInvest		9.10	21.96	35.3
<a href="#">Earnings before interest, taxes, depreciation and amortization (EBIT)</a>	4EnergyInvest		€-858,200	€-1,068,346	€-1,098,21
<a href="#">Net Result</a>	EDP RENOVAVEIS	€50,838,000	€59,018,000	€83,038,000	€68,012,00

[Net Working Capital](#)  
[Own Funds](#)

Net Result



	EDP RENOVAVEIS	4EnergyInvest
2012-12-31	€50,838,000	
2011-12-31	€59,018,000	€-11,899,155
2010-12-31	€83,038,000	€72,521
2009-12-31	€68,012,000	€508,227
2008-12-31	€112,218,000	€-1,593,721
2007-12-31	€0	€-302,311
2006-12-31		€-146,902

# SUMMARY & FUTURE RESEARCH DIRECTION

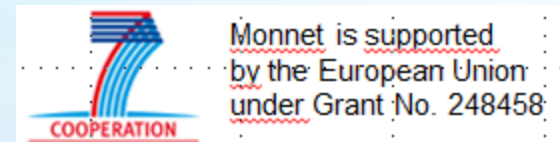
- Interactive data capability across XBRL/non-XBRL data sources
- Improves stakeholder access to cross jurisdictional (multilingual) corporate data
- Increases source and query coverage potential for further development and use
- Motivates target audience participation
  - Registers, regulators ..
- Use of OLAP in XBRL data query and analysis
- Natural Language querying
- Inclusion of other financial sources e.g. EuroStat, FINREP ..



# ACKNOWLEDGEMENTS

- Monnet - Multilingual Ontologies for Networked Knowledge, EU FP7 Grant No. 248458.

<http://monnetproject.eu>



- Science Foundation Ireland under Grant No. SFI/08/CE/I1380 (Lion-2)
- European Business Registers Working Group (xEBR WG) - <http://www.xbrleurope.org/working-groups/xebr-wg>

