



# ERICCa - TFTEI Cost Methodology Tool and Guidance Document on “BAT controls for mobile sources”

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*2nd TFTEI Annual Meeting –  
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## Agenda

- Characteristics of ERICCa\_LCP
- ✓ Main capacities of ERICCa\_LCP
- ✓ Implementation and documentation
- Guidance Document on “BAT controls for mobile sources”

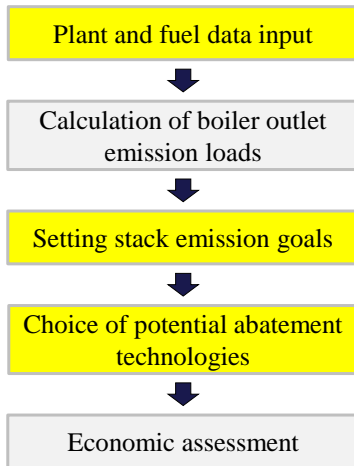
## ERICCa\_LCP at a glance

Name	<b>ERICCa: Emission Reduction Investment and Cost Calculation</b>
Application	<b>ERICCa_LCP: Large Combustion Plants (&gt; 50MW)</b> (other ERICCa-Tools are currently under development)
History	Development started in 2013 Since then the tool has continuously been improved and updated in close collaboration with the subgroup on LCP
Availability	It can be downloaded from the TFTEI website <a href="http://tftei.citepa.org">http://tftei.citepa.org</a> <i>Work in progress =&gt; Costs of reduction techniques for LCP</i>

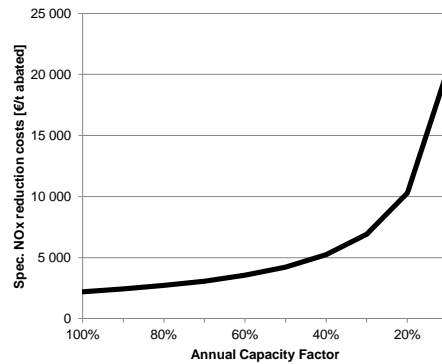
## ERICCa\_LCP at a glance

Plants	Boilers (> 50 MW <sub>th</sub> )
Pollutants	NO <sub>x</sub> , SO <sub>2</sub> , PM
Fuels	Coal, oil, gas, solid biomass (wood) in co-combustion with coal
Fuel approach	Detailed and general approach
Technologies	<b>NO<sub>x</sub></b> : LNB (Low NO <sub>x</sub> Burner), SCR (selective catalytic reduction), SNCR (selective non-catalytic reduction) <b>SO<sub>2</sub></b> : Wet flue gas desulphurization (FGD), lime spray dryer, dry process <b>PM</b> : Fabric filter (FF), electrostatic precipitator (ESP)

## General structure of the cost estimation in ERICCa\_LCP



### Type of results obtained



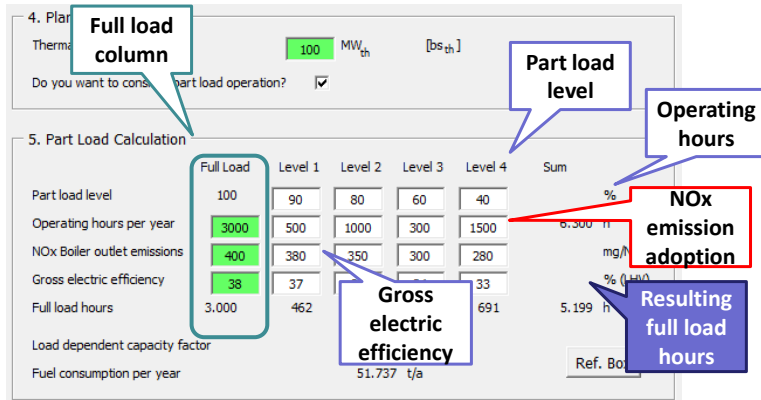
## Latest developments in ERICCa\_LCP

### Implementation of Part Load Calculation

- Total operating hours and the load dependent capacity factor are calculated from the part load input values.
- The following parameters are calculated for both, full load and annual average operation:
  - Fuel consumption
  - Flue gas volume
  - NO<sub>x</sub> emissions
- For design parameters, full load operation is taken into account, for consumption parameters (except electricity) annual average values (considering part load) are used.

## Latest developments in ERICCa\_LCP

### Implementation of Part Load Calculation



### ERICCa\_LCP- capacities

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## Exemplary working sheet



	NO <sub>x</sub>	SO <sub>2</sub>	Dust
Natural Gas	<input type="text" value="Natural Gas - NOx"/> incl. Primary Measures SCR SNCR		
Liquid Fuels	<input type="text" value="Liquid - NOx"/> incl. Primary Measures SCR SNCR	<input type="text" value="Liquid - SO2"/> incl. Fuel Substitution LSFO Flue Gas Desulfurization LSD Flue Gas Desulfurization DSI Flue Gas Desulfurization with Fabric Filter	<input type="text" value="Liquid - Dust"/> incl. ESP
Solid Fuels (coal and bio-mass)	<input type="text" value="Solid - NOx"/> incl. Primary Measures SCR SNCR	<input type="text" value="Solid - SO2"/> incl. Fuel Substitution LSFO Flue Gas Desulfurization LSD Flue Gas Desulfurization DSI Flue Gas Desulfurization with Fabric Filter	<input type="text" value="Solid - Dust"/> incl. ESP PJFF

Click here to clear all entries  
  
 Click here to replace all entries

Show calculation-sheets (recommended for advanced users only or in case of problems with the user interface)

- i) Start to fill in the characteristics of the plant to be tested and fuels used in this plant ('Emission Calc.-Sheets)
- ii) Continue with the sheet of results adapted to the pollutant to be tested.
- iii) Fill requested data appearing in blue cells. Data requested differs from technique to technique
- iv) Observe the results in green cells.

### ERICCa\_LCP - implementation

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## Exemplary working sheet



Liquid Fuels - SO<sub>2</sub>

Basic Assumptions | Fuel Specifications | Boiler Characteristics | Details on SO<sub>2</sub> | Summary for SO<sub>2</sub>

- Reference O<sub>2</sub> content
 

Reference O <sub>2</sub> concentration	<input type="text" value="3"/>	%-vol.	[c <sub>O<sub>2</sub>,ref.</sub> ]
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- Macro-economic parameters
 

Depreciation time	<input type="text" value="20"/>	years	[n]
Interest rate	<input type="text" value="50"/>	% p.a.	[d]
Capital Recovery Factor (CRF)	<input type="text" value="50,02"/>	% p.a.	[CRF]
- Further economic parameters
 

Electricity costs	<input type="text" value="30"/>	€/MWh	[C <sub>elec.spec.</sub> ]
Spec. power requirement of pressure drop	<input type="text" value="0,0414"/>	Wh/mbar <sup>2</sup> ·m <sup>3</sup>	[cons <sub>pd</sub> ]
- Plant characteristics
 

Thermal capacity	<input type="text"/>		
Do you want to consider part load operation?	<input type="text"/>		
- Full Load Calculation
 

Operating hours at nominal capacity	<input type="text" value="68,00"/>	%	[CAP]
Resulting capacity factor	<input type="text"/>		Ref. Box

**Uncommon Value!**

Common values range between 0 and 15! If you want to retain the inserted value anyway, choose 'yes'.

### ERICCa\_LCP - implementation

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## User Manual

- The user manual is providing general information about ERICCa\_LCP and the use of the VBA applications
- Due to the facilitations caused by the VBA programming, it is rather shorter and not very complicated, as it is focusing on the technical aspects rather than the content of the tool
- More details about the calculations in ERICCa\_LCP are provided in the technical document



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### ERICCa\_LCP - documentation

## Technical Document

- The technical document is providing detailed information about the calculations, references and other contents of ERICCa-LCP.
- This is especially relevant for advanced users or if individual adaptations are necessary.
- Both, the user manual and the technical document are publicly available on the TFTEI website. (<http://tftel.citepa.org>)

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### ERICCa\_LCP - documentation

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## Context of the work

**Project** contracted by the **European Commission** (Dec. 2013 – Dec. 2014) in order to

Support **drafting** of a new guidance document for mobile sources

Facilitate its **communication** and consolidation with the Parties to the Convention

Provide **additional background documents** and information to support and complement the guidance document

The work has been carried out by **EMISIA** and **IIASA**

More **information** can be found at

<http://tftei.citepa.org/en/work-in-progress/development-of-the-guidance-document-on-mobile-sources>

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## Guidance document on mobile sources

## Main objective

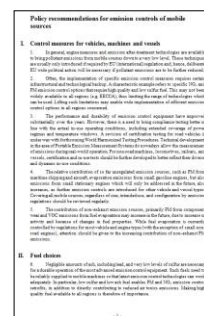
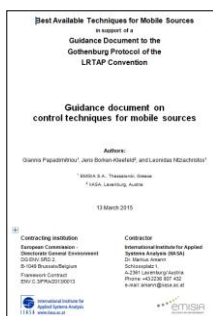
- ✓ Identify possible “Best Available Techniques” (BAT), i.e., measures that have a high probability to **lead to actual emission reductions** for mobile sources
  - Technically **feasible** and **cost-effective** techniques
  - Proven **record of implementation** in real-world applications
  - **Negligible side effects**
- ✓ These candidate techniques or non-technical instruments can be used to meet the **environmental policy targets** set forward by the revised GP

### Guidance document on mobile sources

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## Deliverables



- ✓ **Guidance Document (draft):** A 35p. document to provide input for replacing the 1999 document, after further review by TFTEI
- ✓ **Technical Report:** A 204p. document with detailed technical information and analysis to support the guidance document
- ✓ **Policy Recommendations:** A 3p. document with the policy context

### Guidance document on mobile sources

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## The new (draft) guidance document: organization

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## Basis of guidance

- ✓ BAT presented **per category** of vehicle or machinery
  - Differentiation between BAT applicable to **new** and **older** types
  - **Emerging techniques** separately addressed
- ✓ The document provides **guidance** of emission control techniques, **not encyclopedic presentation** of all possible measures
- ✓ **Local (national) conditions**, may prioritize other BAT
  - Technical, financial, infrastructural **limiting factors** may exist in particular cases
- ✓ BAT may not necessarily be implementation of the latest technology
  - Emphasis on existing stock
  - Cost-effectiveness important

## Emission processes and control measures

Exhaust emissions



**engine measures** (combustion efficiency, control of fuel properties)

**aftertreatment** devices in exhaust line

**fuel switching**, alternative powertrain

**non-technical** measures

PM from component wear and abrasion  
(non-tailpipe primary emissions)



measures for **abatement**

**brake** measures

Evaporative emissions



measures to prevent **gasoline** fuel evaporation from the tank

Thank you very much  
for your attention!  
Questions?

TFTEI Technical Secretariat

English version : <http://tftei.citepa.org/en/>

Russian version : <http://tftei.citepa.org/ru/home/about-us>